EXPRESS5800/120Le

User's Guide

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User's Guide

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Glossary

Equipment Log

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Using This Guide

The EXPRESS5800/120Le User's Guide provides a quick reference to information about your system. Its goal is to familiarize you with your system and the tasks necessary for system configuring and upgrading.

This guide contains the following information:

- Chapter 1, **"**System Overview" provides an overview of your system and describes your system's major system components. See this chapter to familiarize yourself with your system.
- Chapter 2, "Setting Up Your System" tells you how to select a site, unpack the system, assemble the rack-mount subsystem, make cable connections, and power on your system.
- Chapter 3, "Configuring Your System" tells you how to configure the system and provides instructions for running the BIOS Setup Utility and the Adaptec Configuration Utility, which is used to configure SCSI devices in your system. This chapter also provides information on system board jumper settings.
- Chapter 4, "Upgrades and Options" provides you with instructions for upgrading your system with an additional processor, optional memory, options cards, and peripheral devices.
- Chapter 5, "Problem Solving" contains helpful information for solving problems that might occur with your system.
- Appendix A, "System Cabling" includes cabling information for the two onboard SCSI controllers, the onboard IDE controller, and the optional RAID controllers.
- "Glossary" defines the standard acronyms and technical terms used in this manual.
- "Equipment Log" provides you with a sample equipment log for documenting the system configuration and future updates you may make to your system.

Text Conventions

This guide uses the following text conventions.

Warnings, cautions, and notes have the following meanings:

WARNING

Warnings alert you to situations that could result in serious personal injury or loss of life.

CAUTION

Cautions indicate situations that can damage the system hardware or software.

Note: Notes give important information about the material being described.

- Names of keyboard keys are printed as they appear on the keyboard. For example, **Ctrl**, **Alt**, or **Enter**.
- Text or keystrokes that you enter appear as boldface type. For example, type **abc123** and press **ENTER**.
- File names are printed in uppercase letters. For example, AUTOEXEC.BAT.

Related Documents

In addition to this guide, the following system documentation is included with your server either as electronic files on EXPRESSBUILDER or as paper copy shipped with your server.

- *System Release Notes*
  Release Notes provide you with the latest information about your system. This information was not available to be included in your user's guide at the time it was developed and released.
- *Getting Started Sheet*
  The Getting Started Sheet provides several easy-to-follow steps to become familiar with your server documentation and to complete your installation successfully.
- *Network Operating System Configuration Guide*
  This guide contains supplemental instructions needed to install and configure your server Windows NT 4.0 plus Service Pack 6, Novell NetWare v5.0, Santa Cruz Operation (SCO) OpenServer Release 5.05, and UNIXWare 7.1 Network Operating Systems. This document is intended to complement the more detailed procedural documents available from the vendor of the network operating system.

Safety Notices

- **Caution:** To reduce the risk of electric shock which could cause personal injury, follow all safety notices. The symbols shown are used in your documentation and on your equipment to indicate safety hazards.
- **Warning:** Lithium batteries can be dangerous. Improper handling of lithium batteries may result in an explosion. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists.
- **Warning:** The detachable power supply cord is intended to serve as the disconnect device.
- **Warning:** This equipment has a 3-wire, grounded power cord. To prevent electrical hazards, do not remove or defeat the ground prong on the power cord. Replace the power cord if it gets damaged. Contact your dealer for an exact replacement.
- **Warning:** The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cord from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

In the U.S.A. and Canada, the power cord must be a UL-listed detachable power cord (in Canada, CSA-certified), type ST or SJT, 16 AWG, 3-conductor, provided with a molded-on NEMA type 5-15 P plug cap at one end and a molded-on cord connector body at the other end. The cord length must not exceed 9 feet (2.7 meters).

Outside the U.S.A. and Canada, the plug must be rated for 250 VAC, 10 amp minimum, and must display an international agency approval marking. The cord must be suitable for use in the end-user country. Consult your dealer or the local electrical authorities if you are unsure of the type of power cord to use in your country. The voltage change occurs via a switch in the power supply.

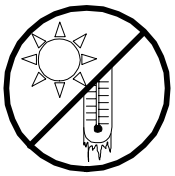
- **Warning:** Under no circumstances should the user attempt to disassemble the power supply. The power supply has no user-replaceable parts. Inside the power supply are hazardous voltages that can cause serious personal injury. A defective power supply must be returned to your dealer.

Safety Notices for Users Outside of the U.S.A. and Canada

- **PELV (Protected Extra-Low Voltage) Integrity:** To ensure the extra-low voltage integrity of the equipment, connect only equipment with mains-protected electrically-compatible circuits to the external ports.
- **Remote Earths:** To prevent electrical shock, connect all local (individual office) computers and computer support equipment to the same electrical circuit of the building wiring. If you are unsure, check the building wiring to avoid remote earth conditions.
- **Earth Bonding:** For safe operation, only connect the equipment to a building supply that is in accordance with current wiring regulations in your country. In the U.K., those regulations are the IEE.

Care and Handling

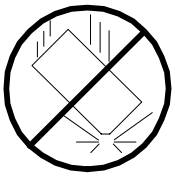
Use the following guidelines to properly handle and care for your system.



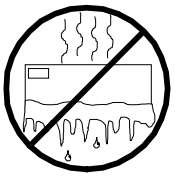
Protect the system from extremely low or high temperatures. Let the system warm (or cool) to room temperature before using it.

Keep the system away from magnetic forces.

Keep the system dry. Do not wash the system with a wet cloth or pour fluid into it.



Protect the system from being bumped or dropped.



Check the system for condensation. If condensation exists, allow it to evaporate before powering on the system.

Keep the system away from dust, sand, and dirt.

1

System Overview

- Overview
- System Chassis
- Power Supplies
- Peripheral Bays
- SAF-TE Logic
- System Board Features
- AC Link Mode
- Remote Power-On (Wake ON LAN) Function
- System Security

Overview

This server is a modular, multiprocessing server based on the Intel® Pentium® III microprocessor family. It is a solid performer and offers the latest technology. The combination of compute performance, memory capacity, and integrated I/O provides a high performance environment for many server market applications. These range from large corporations supporting remote offices to small companies looking to obtain basic connectivity capability such as file and print services, e-mail, web access, web site server, etc.

This server is conveniently housed and available as a tower-based system or as a rack-mount system (fits into a standard EIA 19-inch rack assembly) as shown in Figures 1-1 and 1-2.

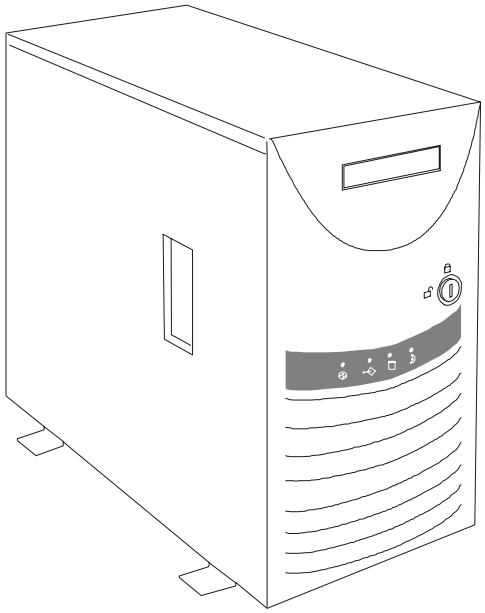


Figure 1-1. Tower-Based System Front View

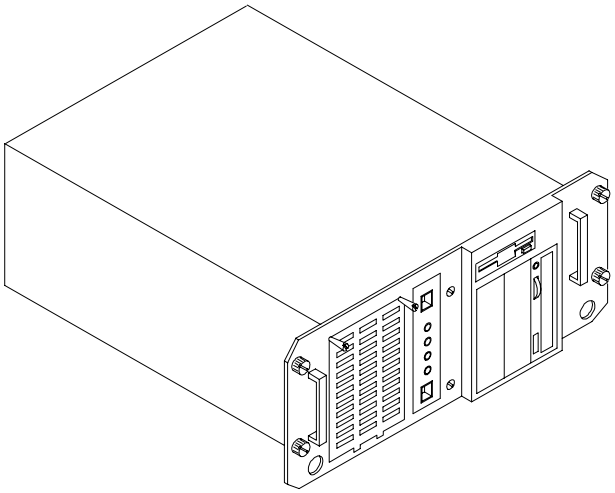


Figure 1-2. Rack-Mount System Front View

Your server includes hot-swap SCSI hard disk drive bays. See Figure 1-3. The hot-swap SCSI hard disk drive bays support a maximum of six 1.0-inch SCSI hard disk drives that can be swapped in or out of the system without powering down, if a RAID controller is configured in the system.

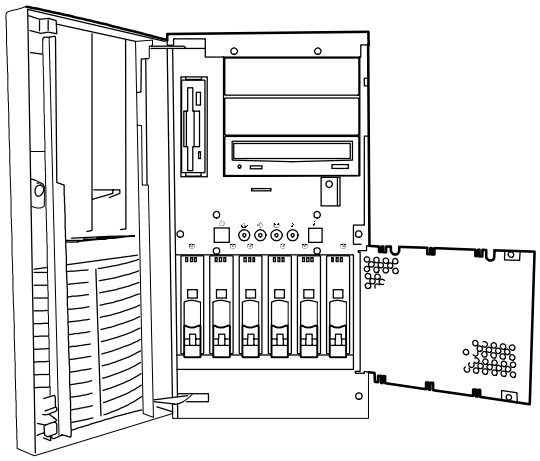


Figure 1-3. SCSI Hard Disk Drive Bays

As application requirements increase, you can expand your server with an additional processor, additional memory, add-in boards and peripheral devices: tape devices, CD-ROM, and hard disk drives.

Your server features the following major components:

- Single or dual high-performance Pentium III processor.
- 64 MB to 4 GB of memory, using up to four DIMMs.
- Six PCI expansion slots for add-in boards.
- Embedded PC-compatible support (serial, parallel, mouse, keyboard, diskette, USB, LAN, and video).
- Integrated onboard ATI RAGE IIC Super Video Graphics Array (SVGA) controller with 4 MB of video memory.
- Adaptec AIC7899 SCSI controller providing Wide Ultra2 and Ultra-160/M SCSI interfaces.
- Integrated onboard Network Interface Controller (NIC), an Intel 82559 PCI LAN controller for 10 or 100 Mbps Fast Ethernet networks with an RJ-45 Ethernet connector.
- Single Channel enhanced IDE controller.
- Three 5 ¼-inch removable media expansion bays with a CD-ROM drive installed in one bay.
- One 3 ½-inch half-height bay with a diskette drive installed.
- Integrated dual Universal Serial Bus (USB) ports.
- Hardware monitors (temperature, fans, and voltage) and software monitors to indicate failures.

- Redundant cooling fans.
- Redundant 350-watt, hot-swap power supplies in some models.
- Keylocked front cover, including an intrusion switch (tower system only) and an interlock switch on the side cover.

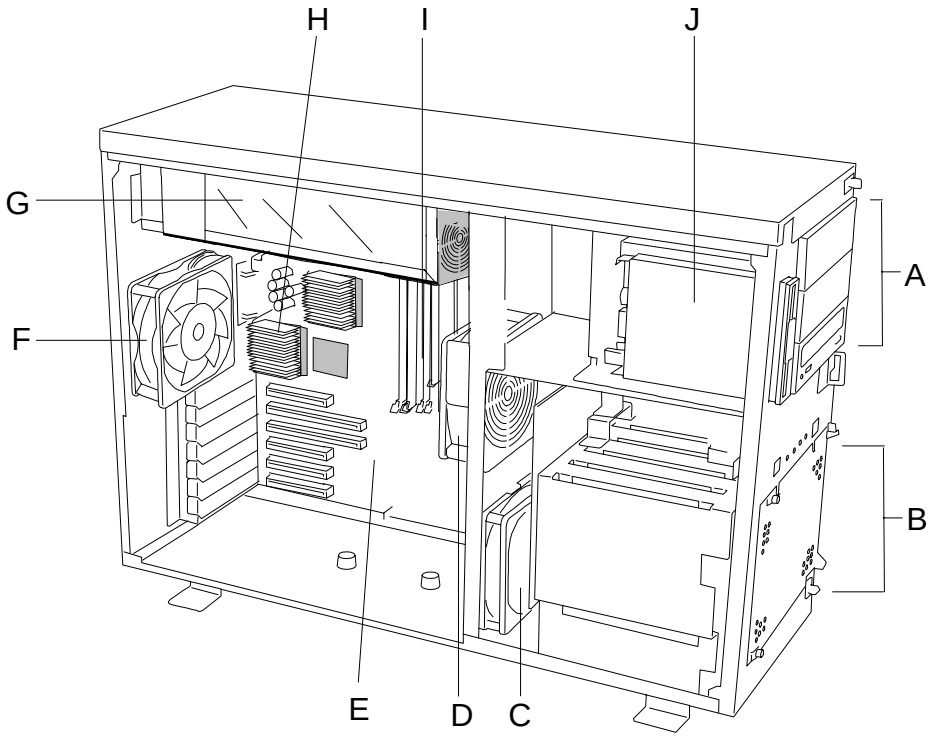
Hot-Swap SCSI Hard Drive Bays

- Six hot-swap 1.0-inch SCSI hard disk drive bays accessible from the front of the chassis which can be swapped in or out of the system without powering it down if RAID is configured in the system.
- High degree of SCSI disk fault tolerance and advanced disk array management features through the use of RAID technology, if an optional RAID controller is installed.
- SCSI controller, cables, backplane and devices are Ultra-160/M ready.

System Chassis

The system chassis (Figure 1-4) is an easy-to-expand, fabricated metal structure. The major system components are shown in the following illustrations.

> ***Note:*** The system air duct, located between the front and rear fans is removed in the following illustration in order to show components located on the system board.



A. Removable Media Bay

B. SCSI Hard Disk Drive Bays

C. SCSI Hard Disk Drive Bay Fan

D. Front Input Fan

E. System Board

F. Rear Exhaust Fan

G. *System Power Supply (2nd power supply is optional)

H. Pentium III Processors (2nd Processor is optional)

I Memory

J Diskette Drive

*The power supply shown may differ from the power supply in your server.

Figure 1-4. System Chassis

Power Supplies

The power supply in your server is dependent on your server model. Two types of power supplies are used.

- The 300 watt voltage-sensing power supply provides system power and operates at 115 or 230 VAC at an operating frequency of 50/60 Hz.
- The 350 watt voltage-sensing power supply provides system power and also operates at an operating frequency of 50/60 Hz. With this configuration, a second optional 350 watt power supply may be added as part of a fault-tolerant hot-swap design. With two power supplies installed, in the event of a power supply failure, the load is transferred to the remaining power supply without interruption to normal system operation.

> ***Note**: The power supplies are not hot swappable unless there are two supplies installed.*

The power supplies are designed to comply with existing emission standards and provide sufficient power for a fully loaded system configuration.

Peripheral Bays

The system supports a variety of standard PC AT-compatible peripheral devices. The chassis includes these peripheral bays:

- A 3.5-inch front panel bay for mounting the standard 3.5" diskette drive (supports 720 KB and 1.44 MB diskette media)
- Three 5.25-inch removable media front panel bays for mounting half-height 5.25-inch peripheral devices: standard CD-ROM drive and optional tape drives, etc.
- Your system includes six hot-swap hard disk drive bays for mounting up to six hot-swap hard disk drives in easily removable drive carriers.

> ***Note:** The hot-swap SCSI hard disk drive bays contain a hot-swap back plane that require an 80-pin single connector attachment (SCA) connector on the drives that you install.*

SAF-TE Logic

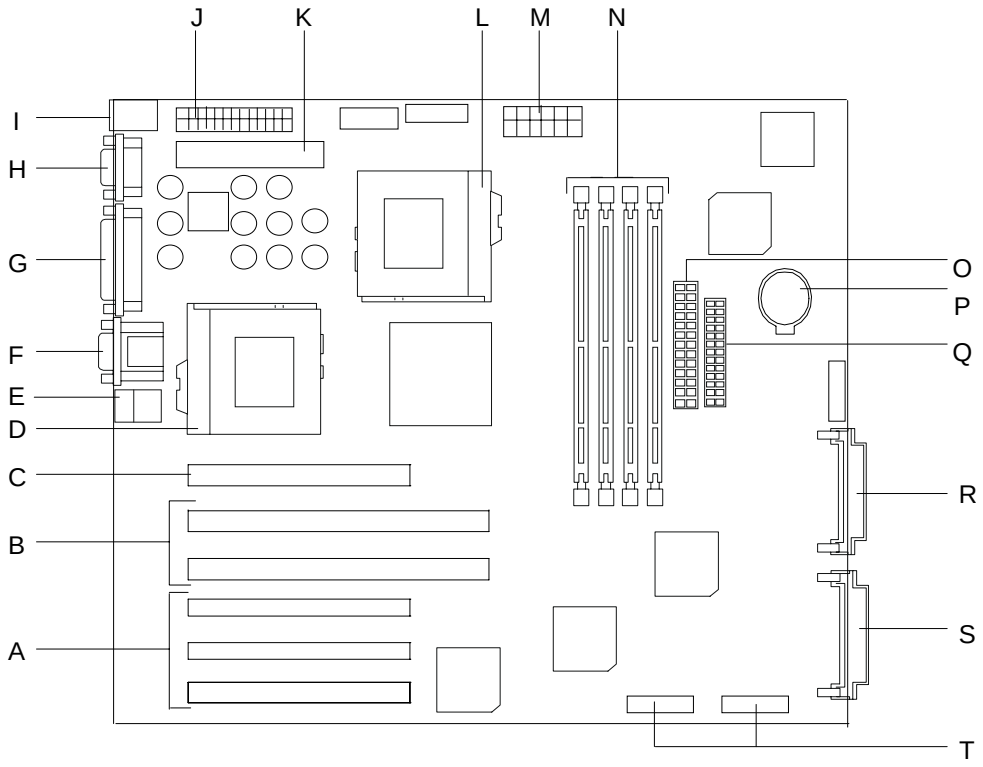
> ***Note:*** SAF-TE Logic is in systems that include the hot-swap SCSI disk drive cage. SAF-TE Logic is not available in systems that include the standard SCSI disk drive cage.

The SCSI backplane includes SAF-TE (SCSI Accessed Fault Tolerant Enclosure) logic that provides an interface to the disk subsystem that supports status signals, hot swapping drives, and enclosure monitoring.

The transport mechanism for the standardized alert detection and status reporting is the SCSI bus. Disk drives, power supplies, cooling fans, and temperature are continually monitored and the conditions then reported over the SCSI bus to the system. When used with RAID management software the user can be alerted of impending or imminent disk conditions requiring attention. This allows the user to react to conditions that could normally go unnoticed until data loss.

System Board Features

The system board (Figure 1-5) offers a “flat” design with the processor and memory subsystems residing on the board. This figure shows the major components on the system board. The following subsections describe the system board major components.



A.	32 bit, 33MHz PCI slots for add-in boards (3)	K.	Secondary VRM connector
B.	64 bit, 66MHz PCI slots for add-in boards (2)	L.	Secondary processor connector
C.	32 bit, 33MHz PCI slot for add-in boards (1)	M.	Auxiliary power connector
D.	Primary processor connector	N.	Memory DIMM connectors
E.	LAN RJ-45 network controller connector	O.	IDE interface connector
F.	SVGA monitor port connector	P.	Lithium backup battery
G.	Parallel port connector Below: Mouse PS/2 compatible connector and Keyboard PS/2 compatible connector	Q.	Diskette drive connector
H.	Serial port connectors (top COM 1, bottom COM2)	R.	External SCSI and media bays connector
I.	USB connectors (top USB 1, bottom USB 2)	S.	Internal SCSI HDD bay connector
J.	Main power connector	T.	System Jumpers

Figure 1-5. System Board

Pentium III Processor

Depending on system configuration, your server includes one or two Pentium III processors. Each Pentium III plugs into a ZIF (Zero Insertion Force) socket on the system board. The processor includes a numeric coprocessor, a 256KB L2 cache and operates at a bus speed of 133MHz. The optional second Pentium III processor enhances performance and enables symmetric multiprocessing (SMP).

System Memory

The system board contains four 168-pin DIMM sockets. Memory is partitioned as four banks of SDRAM registered DIMMs (PC133 compatible), each providing 72 bits of noninterleaved memory (64-bit main memory plus ECC). Your system may include from 64 MB to 4 GB of memory, using up to four DIMMs.

System memory begins at address 0 and is continuous (flat addressing) up to the maximum amount of DRAM installed (exception: system memory is noncontiguous in the ranges defined as memory holes using configuration registers). The system supports both base (conventional) and extended memory.

Real-Time Clock/Calendar

The real-time clock provides system clock/calendar information stored in a non-volatile memory (NVRAM). The real-time clock battery provides power backup for the real-time clock.

BIOS

A BIOS and Setup Utility are located in the Flash EPROM on the system board and include support for system setup and Legacy device configuration. A number of security, reliability, and management features also have been incorporated to meet vital server needs.

I/O Expansion Slots

Your server's expansion capabilities meet the needs of file and application servers for high performance I/O by providing a combination of PCI expansion slots.

The I/O expansion slots in your server are located on the system board. See Figure 1-6. The system board has two 66 MHz PCI connector slots that accommodate 64 bit PCI cards and four 33 MHz PCI connector slot that accommodate 32 bit PCI cards.

PCI features:

- Bus speed up to 66 MHz (PCI 2 and PCI 3)
- 64-bit memory addressing (PCI 2 and PCI 3)
- 32-bit memory addressing (PCI 1, PCI 4, PCI 5, and PCI 6)
- 5 V/3.3 V signaling environment
- Burst transfers up to a peak of 264 MB/s (64 bit, 66 MHz PCI)
- 8-, 16-, 32-, or 64-bit data transfers
- Plug and Play ready
- Parity enabled.

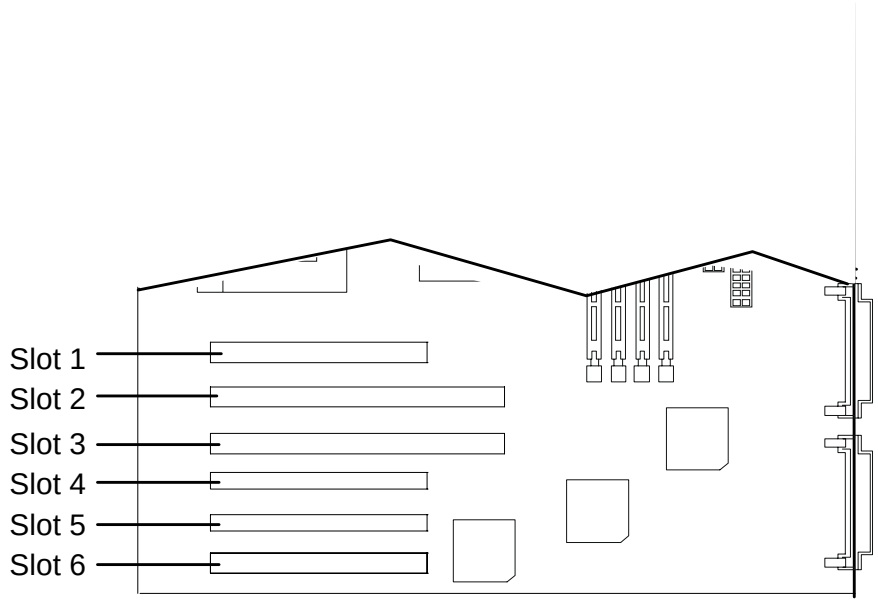


Figure 1-6. PCI Connector Slots

IDE Controller

The system includes a single channel enhanced IDE 32 bit interface controller for intelligent disk drives with disk controller electronics onboard. The controller has a connector located on the system board that supports a master and a slave device. The IDE controller provides support for the internally mounted CD-ROM.

The device controls:

- PIO and DMA transfer modes
- Mode 4 timings
- Transfer rates up to 33 MB/s
- Buffering for PCI/IDE burst transfers
- Master/ Mode only.

Keyboard and Mouse Controller

The keyboard and mouse controller is PS/2 compatible.

Network Controller

The system board includes a 10BASE-T/100BASE-TX network controller based on the Intel 82559 Fast Ethernet PCI Bus Controller. As a PCI bus master, the controller can burst data at up to 132 MB/sec. The controller contains two receive and transmit FIFO buffers that prevent data overruns or underruns while waiting for access to the PCI bus. The controller has the following:

- 32-bit PCI bus master interface (direct drive of bus), compatible with *PCI Bus Specification, Revision 2.1*
- Chained memory structure with improved dynamic transmit chaining for enhanced performance
- Programmable transmit threshold for improved bus utilization
- Early receive interrupt for concurrent processing of receive data
- On-chip counters for network management
- Autodetect and autoswitching for 10 or 100 Mbps network speeds
- Support for both 10 Mbps and 100 Mbps networks, capable of full or half duplex, with back-to-back transmit at 100 Mbps.
- Support for Wake On LAN.

SCSI Controller

The system board includes an embedded Adaptec AIC7899 dual function SCSI controller. The AIC7899 provides Ultra-160/M and Wide Ultra SCSI interfaces as two independent PCI functions. As implemented on the system board, interface A attaches to an Ultra-160/M SCSI backplane that supports up to six Ultra-160/M SCA drives. Controller B, the Wide Ultra SCSI interface, may be used to support SCSI devices in the removable media bays.

Video Controller

The system has an integrated ATI Rage IIC 64 bit high-performance SVGA subsystem that supports the following:

- BIOS compatibility with VGA, EGA, CGA, Hercules Graphics, and MDA
- 4 MB of 10 ns onboard Synchronous Graphics Memory (SGRAM)
- Pixel resolutions up to 1280 X 1024
- Analog VGA monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace noninterlaced frequency of 100 Hz.

Peripheral Controller

The advanced integrated peripheral controller supports two serial ports, two universal serial ports, one parallel port, diskette drive, PS/2-compatible keyboard and mouse, and integrated Real Time Clock (RTC). The system provides the connector interface for each port.

Serial Ports

Both serial ports are relocatable. Each serial port can be set to one of four different addresses and can be enabled separately. When disabled, serial port interrupts are available to add-in boards.

Parallel Port

One IEEE 1284-compatible 25-pin bidirectional EPP (supporting levels 1.7 and 1.9) parallel port is provided. BIOS programming enables the parallel port and determines the port address and interrupt. ECP mode is supported with 2 possible DMA channels. When disabled, the interrupt is available to add-in boards.

External Device Connectors

The external I/O connectors provide support for a PS/2 compatible mouse and a keyboard, for a SVGA monitor, 2 serial port connectors, a parallel port connector, LAN port, and two USB connections.

System Board Management Controller (BMC)

Server management is concentrated in the System Board Management Controller (BMC). The BMC and associated circuitry are powered from a 5Vdc standby voltage, which remains active when system power is switched off, but the ac power source is still on and connected.

The BMC supports the Management Workstation Application (MWA), which allows remote server management via a modem or direct connection to a manager system. Events monitored by the manager system include over-temperature and over-voltage conditions, fan failure, or chassis intrusion.

Information on the Management Workstation Application (MWA) may be found in Appendix B of this User's Guide.

One major function of the BMC is to autonomously monitor system management events, and log their occurrence in the nonvolatile System Event Log (SEL). The events being monitored include overtemperature and overvoltage conditions, fan failure, or chassis intrusion. To enable accurate monitoring, the BMC maintains the nonvolatile Sensor Data Record (SDR), from which sensor information can be retrieved. The BMC provides an ISA host interface to SDR sensor information, so that software running on the server can poll and retrieve the server's current status.

The BMC performs the following:

- Monitors server board temperature and voltage
- Monitors processor presence and controls Fault Resilient Boot (FRB)
- Detects and indicates baseboard fan failure
- Manages the SEL interface
- Manages the SDR Repository interface
- Monitors the SDR/SEL timestamp clock
- Monitors the system management watchdog timer
- Monitors the periodic SMI timer
- Monitors the event receiver
- Controls secure mode, including video blanking, diskette write-protect monitoring, and front panel lock/unlock initiation
- Controls Wake On LAN via Magic Packet support.

ACPI

The Advanced Configuration and Power Interface (ACPI) aware operating system can place the system into a state where the hard drives spin down, the system fans stop, and all processing is halted. However, in this state the power supply is still on and the processors are still dissipating some power such that the power supply fan and processor fans are still running.

> ***Note:*** ACPI requires an operating system that supports its feature.

This server system BIOS supports sleep states s0, s1, s4, and s5. However, with future versions of Microsoft Windows 9X that support ACPI, the system BIOS only supports sleep states s0, s1, and s5. With future versions of Microsoft Windows NT that support ACPI, the system BIOS will only support sleep states s0, s1, s4, and s5.

> **⚠ CAUTION**
> Only when the AC power is disconnected is the system completely off.

The sleep states are defined as follows:

- s0: Normal running state.
- s1: Processor sleep state.
  No context will be lost in this state and the processor caches will maintain coherency.
- s4: Hibernate or Save to Disk.
  The memory and machine state are saved to disk. Pressing the power button or other wakeup event restores the system state from the disk and resumes normal operation. This assumes that no hardware changes have been made to the system while it was off.
- s5: Soft off.
  Only the RTC section of the chipset and the BMC are running in this state.

AC Link Mode

The AC link mode allows the system to monitor its AC input power so that when the AC input power is lost and then restored the system will return itself to one of three pre-selected settings, listed as follows:

- Power On
- Last State (Factory Default Setting)
- Stay Off.

The AC link mode settings can be changed by running the BIOS Setup Utility (F2). Refer to Chapter 3 "Configuring Your System."

Remote Power-On (Wake ON LAN) Function

The remote power-on function turns on the system power by way of a network or modem. If the system power is set to OFF, it can be turned on remotely by sending a specific packet from the main computer to the remote system. This feature can be enabled or disabled using the BIOS Setup Utility. See Chapter 3.

Note: This feature must be supported by your operating system.

System Security

To help prevent unauthorized entry or use of the system, the system includes a full lockable front panel and Server Management software that monitors the system intrusion switches.

Security with Mechanical Locks and Monitoring

The front panel of the tower-based system contains a mechanical lock and an intrusion switch to prevent access to the front of the computer chassis. The computer chassis includes an interlock switch on the side cover. When any of these covers are opened, the switch transmits an alarm signal to the system board, where server management software processes the signal.

Security with the rack-mount system is identical to the tower-based system stated above, except that there is no front cover associated with the rack-mount system.

Software Locks via the System Setup Utility

The BIOS Setup Utility provides a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, access to the system is allowed only after the user enters the correct password(s). For example:

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period—1 to 120minutes.
- Set and enable an administrative password.
- Set and enable a user password
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches.
- Disable writing to the diskette drive when secure mode is set.

2

Setting Up the System

- Overview
- Selecting a Site
- Unpacking the System
- Rack-Mount Subsystem Assembly
- Getting Familiar with the System
- Making Connections
- Connecting the Power Cord
- Powering On Your System

Overview

This chapter describes how to select a site, unpack the system, make cable connections, and power on the tower-based or rack-mount system units. Also, provided are the instructions for assembling the rack-mount system unit.

Selecting a Site

The system operates reliably in a typical office environment. Choose a site that is:

- Near grounded, three-pronged power outlets.

Note: For the United States and Canada, this means a NEMA 5-15R outlets for 100-120 VAC or NEMA 6-15R outlets for 200-240 VAC. For other international sites, this means three-pronged power outlets applicable for the electrical code of the region.

⚠ WARNING

Be sure the power service connection is through a properly grounded outlet.

- Clean, dust-free, and well ventilated. Front and rear ventilating openings kept free of obstructions. Away from sources of heat, vibration or physical shock.
- Isolated from strong electromagnetic fields and electrical noise produced by electrical devices (such as air conditioners, large fans, large electric motors, radio and TV transmitters, and high-frequency security devices)
- Spacious enough to provide at least five inches (13 centimeters) behind the system and three inches (eight centimeters) on each side of the system for proper cooling, airflow, and cable clearance.
- Easily accessible for system maintenance and installation of system upgrades.

Unpacking the System

⚠ WARNING

Your system weighs approximately 65 pounds (29.25 kg). If your system contains numerous optional boards and peripheral devices, it will weigh more. To avoid personal injury, make sure you have someone help you lift or move the system.

When you receive your system, inspect the shipping containers prior to unpacking. If the shipping boxes are damaged, note the damage, and if possible, photograph it for reference. After removing the contents of the containers, keep the cartons and the packing materials. If the contents appear damaged when you unpack the boxes, file a damage claim with the carrier immediately.

Rack-Mount Subsystem Assembly

This section provides the instructions for assembling the rack-mount server unit into a standard EIA 19-inch rack cabinet.

Before You Begin

Before you begin, please review the following cautions, warnings, and general guidelines.

⚠ WARNING

Be sure that power to the system is turned off and unplugged. All voltage is removed only when the power cords are unplugged.

- Avoid excessive vibration and shock. Dropping an electronic component can cause serious damage.
- Do not disconnect or remove parts other than those specified in the procedure.
- Do not touch I/O connector pins.
- All screws are Phillips-head, unless otherwise specified.
- On completion of any assembly or re-assembly, perform a power-on test. If a fault occurs, verify that the assembly or re-assembly was performed correctly. If the problem persists, see "Problem Solving" in Chapter 5.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Rack Hardware

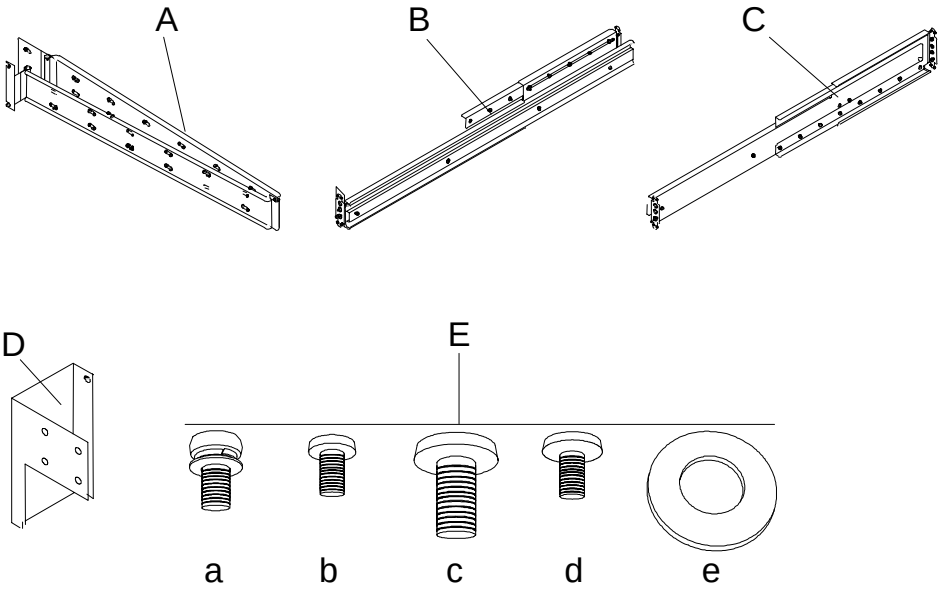
⚠ CAUTION

Ensure that the location of the rack-mount server does not create an unstable condition when installed in the rack cabinet.

Before you begin select an appropriate location in your rack cabinet for the rack-mount server. To improve rack stability, mount heavier items towards the bottom of the rack cabinet. If the rack is a stand-alone unit and the rack is more than 75% filled with components, consider installing an optional stabilizer kit.

Note: When planning your system configuration for the rack cabinet you should consider the length of the cables that interconnect system components.

The rack mounting components that shipped with your server are shown in Figure 2-1. Your server is mounted on a set of slide rail assemblies that allow it to move freely in and out of the system rack. The triple-hinged cable retention arm assembly attaches to the rear of the server and to the rack frame and allows cables to swing in and out of the way as the server slides back and forth within the rack cabinet. All the server cables can be tie-wrapped to the cable retention arm.



A. Cable Retention Arm Assembly

B. Slide Rail Assembly (left)

C. Slide Rail Assembly (right)

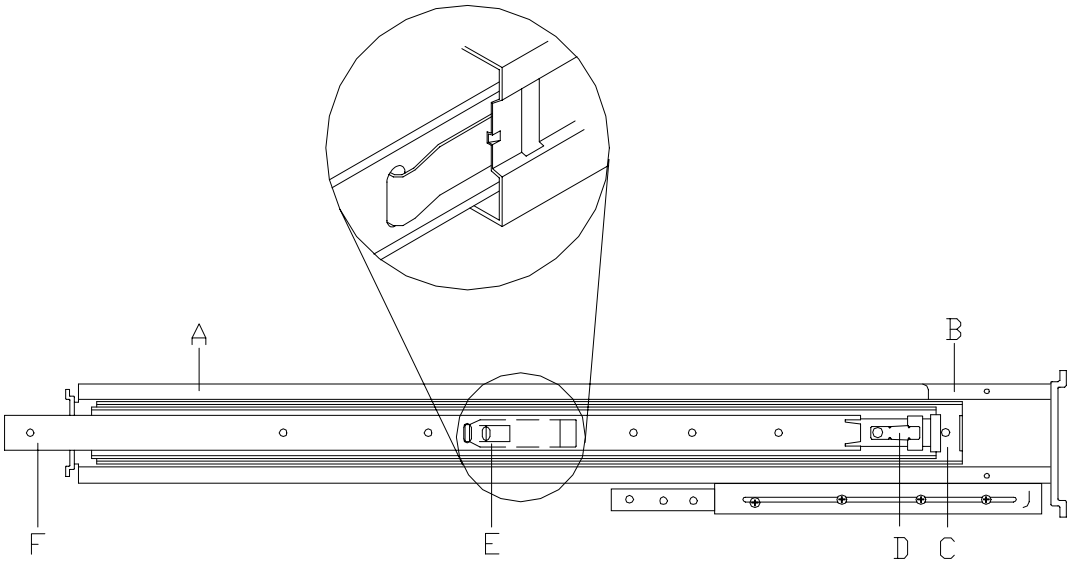
D. Cable Arm Bracket

E. Assorted hardware

Figure 2-1 Rack Mounting Components

Preparing the Slide Rail Assemblies

1. Locate the two slide rail assemblies. Each slide rail assembly consists of an outer bracket (B) and an inner bracket (A). See Figure 2-2. The assembly also has a slide rail assembly attached to its inner bracket consisting of an extension rail assembly (C) with a center slide bar (F). The slide rail outer bracket and inner bracket are the parts of the assembly that attach to the rack cabinet. The center slide bar attaches to the side of the server.



A. Inner bracket

B. Outer bracket

C. Extension rail assembly

D. Extension rail assembly safety latch

E. Center slide bar safety latch

F. Center slide bar

Figure 2-2. Slide Rail Assembly (2)

> ***Note:*** Perform Step 2 on each slide rail assembly if the center slide rails are not factory-installed on your server. If the center slide rails are installed on each side of your server, go to Step 3.

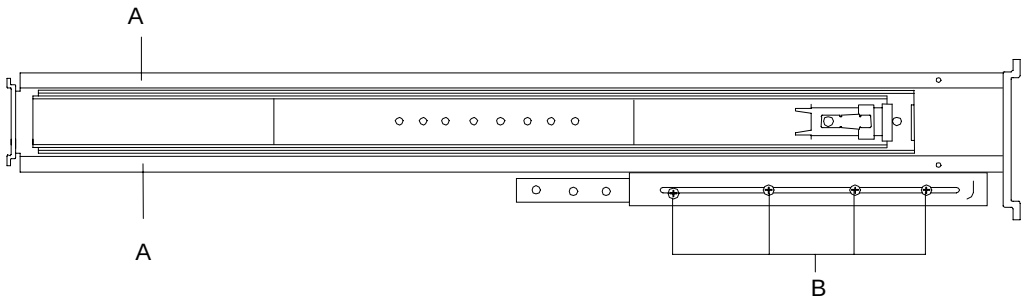
2. Remove the center slide bar from each slide rail assembly as follows:

   - Position the slide rail assembly on a flat surface with the center slide bar facing up.
   - Fully extend the telescoping slide bars until they lock in place (see Figure 2-2, F).

- While pressing up on the center slide bar safety latch (see Figure 2-2, E), slide the center slide bar (F) out of the assembly and set aside for installation on the server.
- Ensure that the safety latch on the extension rail assembly (see Figure 2-2, D) is centered and then collapse the center slide rail into the outer bracket rail.

3. With each slide rail assembly on a flat surface loosen the four screws that attach their outer and inner brackets together. See Figure 2-3, B.

4. Set the slide rail assemblies aside for later installation into the rack cabinet.



A – Inner bracket

B – Adjustment screws

Figure 2-3 Preparing the Slide Rails

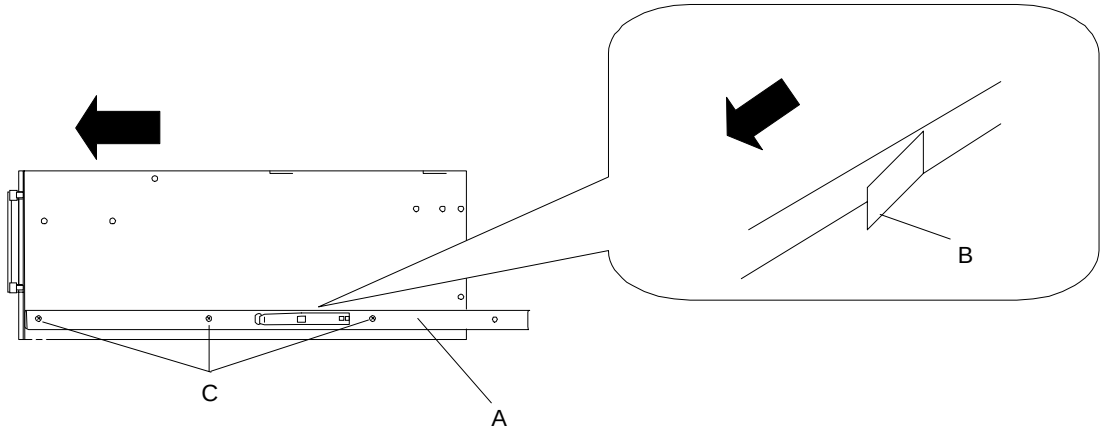
Attaching the Center Slide Bar to the Server

Using the two center slide bars removed in the previous procedure attach them to the server as follows:

1. Align the mounting holes in each slide bar to the threaded holes on the side of the server (see Figure 2-4).

> ***Note:*** The holes in the center slide bars line up to the server chassis only when the safety latch (B) is pointed towards the front of the server.

2. Secure each slide bar to the server with three screws, as shown in Figure 2-4. Ensure the safety latch (B) is pointed towards the front of the server. Use the screws shown as "C" in Figure 2-1.



A. Center Slide Bar (2)

B. Safety Latch

C. Screws (Type C)

Figure 2-4. Attaching the Inner Component Slide Bar to the Server

Installing the Cable Retention Arm Bracket

1. Install the Cable Retention Arm Bracket to the rear of the server. Refer to Figure 2-5. Use the screws shown as “B” in Figure 2-1.

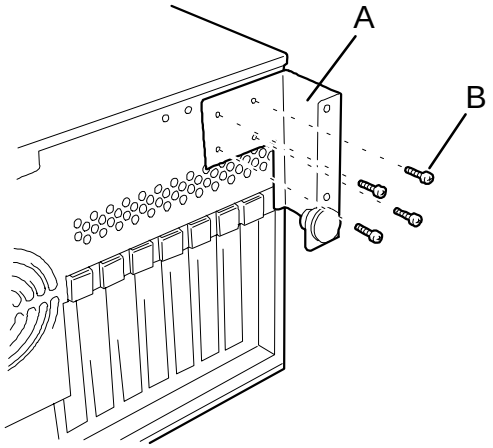


Figure 2-5. Cable Retention Arm Bracket

Installing the Slide Rail Assemblies into the Rack Cabinet

Before you can mount the server in the rack cabinet, you must install the slide rail assemblies in the rack cabinet.

> ***Note:*** You must use the following procedure to prepare the rack cabinet before mounting the server into it. Observe all safety precautions, warnings, and cautions noted throughout this chapter.

1. Determine where you want to install the server in the rack cabinet.
   - To improve rack stability, mount the server towards the bottom of the rack cabinet.
   - If there are units already installed, install the server into the next empty space from the bottom of the rack cabinet.
2. Starting at the bottom of the rack cabinet or at the top or bottom of a previously mounted unit, measure the number of screw hole locations on the front vertical mounting rails and rear vertical mounting rails for the slide rail assemblies. Mark the location with a pencil on the outside of both the front and rear vertical mounting rails.

> ***Note:*** For vertical reference, every three screw holes on the rack vertical mounting rail are equal to 1U (1.75 inches).

3. While marking the hole locations for the Rack Mounting Bracket Assemblies, also mark the locations on the front vertical mounting rails for the cage nuts, which hold the thumbscrews of the server.

4. Insert four M5 cage nuts in their marked locations on the front vertical mounting rails (see Figure 2-6), as follows:

   - Position the cage nut on the inside of the front vertical mounting rails.
   - Hook the side lip of a cage nut into the square hole in the rail.
   - Push the other side lip of the cage nut into the square hole in the rail until it is secured.
   - Repeat for each cage nut.

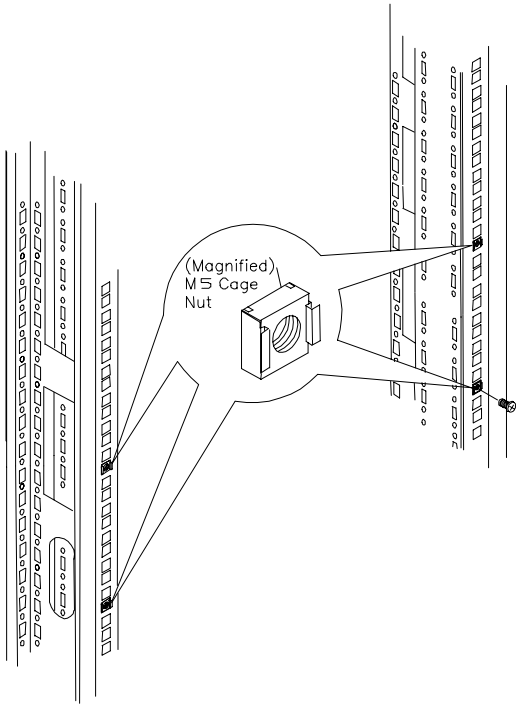


Figure 2-6. Inserting the Cage Nuts for the Server Faceplate

5. Measure the distance between the front and rear vertical mounting rails of your system rack. See Figure 2-7. You'll use this measurement for a preliminary adjustment of the slide rails in the next step.

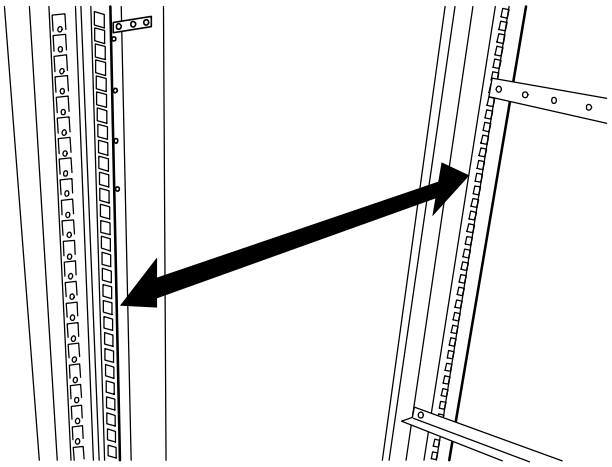


Figure 2-7. Vertical Mounting Rail Measurement

6. Adjust each slide rail to the approximate length measurement determined in Step 3. The outer bracket adjustment screws (4) may need to be removed and repositioned. See Figure 2-8, A. Loosely tighten the screws. Final adjustment will be made once the slide rails are installed into the system rack.

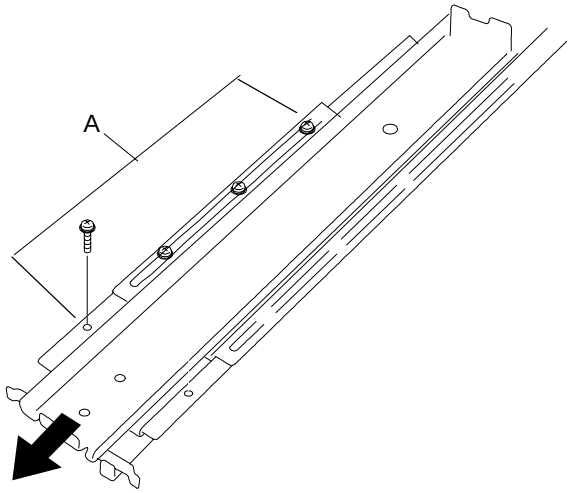


Figure 2-8. Adjusting the Slide rail

7. Align one of the slide rail assemblies behind the mounting holes in the vertical mounting rail (see Figure 2-9) located on the left side of the rack cabinet. The tabs on the front and rear of the slide rail assembly help to align it with the holes in the vertical-mounting rail.

8. Install two screws and washers to secure the front of the slide rail assembly to the front vertical-mounting rail and tighten loosely. See Figure 2-9. Use the screws shown as “D” in Figure 2-1.

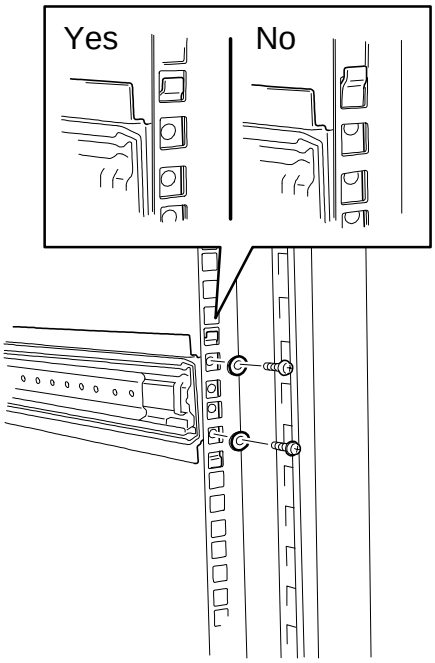


Figure 2-9. Installing the Slide rail Assemblies

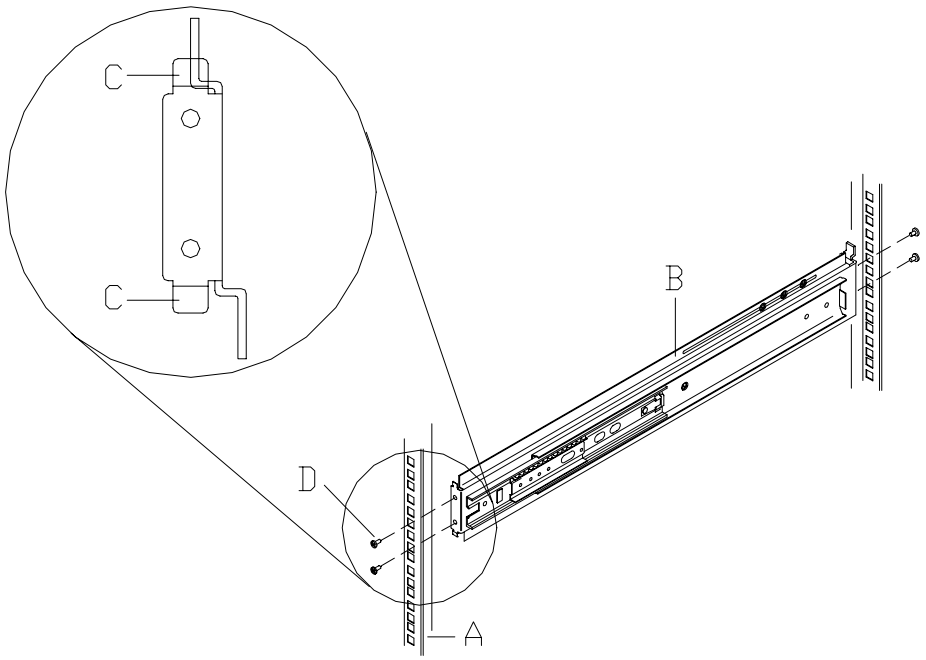
9. Carefully align the rear holes of the slide rail assembly with the holes in the rear vertical-mounting rail.

10. Install two screws and washers to secure the rear of the slide rail assembly to the vertical-mounting rail. See Figure 2-10. Use the screws shown as “D” in Figure 2-1.

11. Tighten all four screws holding the slide rail assembly to the vertical mounting rails.

12. Adjust and tighten the four screws that attach the outer and inner brackets together. See Figure 2-8, A.

13. Repeat steps 5 through 12 for the mounting the other slide rail assembly on the right side of the rack cabinet.



A. Vertical mounting rail

B. Rack mounting assembly

C. Alignment tab

D. Screws

Figure 2-10. Installing the Left Slide Rail Assembly into the System Rack

Mounting the Server in the Rack Cabinet

Use the following procedure to mount the server into the rack cabinet (see Figure 2-11).

⚠ WARNING

Anchor the Rack Cabinet. The rack cabinet must be anchored to an unmovable support or a front stabilizer to prevent it from falling over when one or more units are extended in front of it on slide assemblies. The anchors must be able to withstand a force of up to 113 kg (250 lbs.). You must also consider the weight of any other device installed in the rack.

Avoid Injury. It is required that two people are present when lifting and assembling the rack-mount server into a rack cabinet.

Do not attempt to lift or move the server unit by the latches on the power supplies.

1. Pull the two extension rail assemblies (see Figure 2-11, A) out of each rack mounting assembly on the rack cabinet until they lock in place.

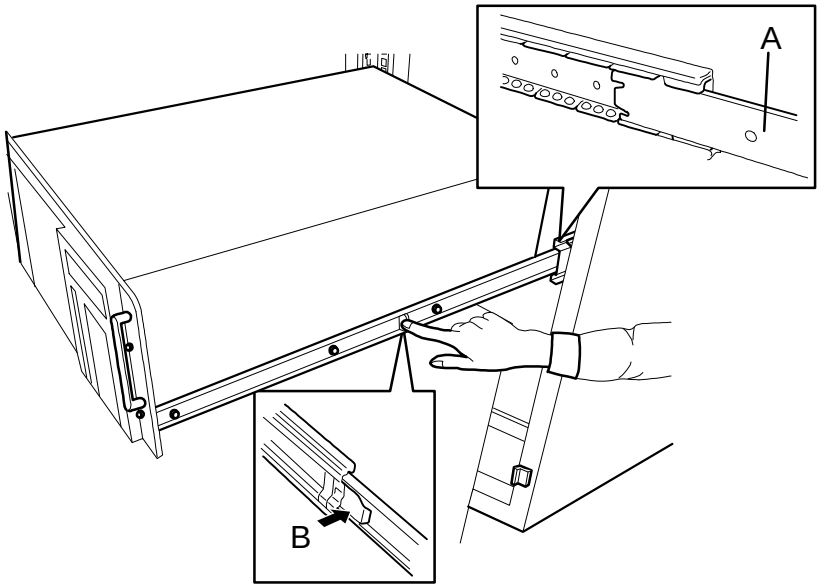


Figure 2-11. Mounting the Server into the System Rack

2. With someone assisting you, lift and slide the server into the extended rail slider assemblies.
   - Align the server center slide bars with the extended rail assemblies.
   - Carefully slide the server into the extended rail assemblies until it stops.
   - Carefully press in on the safety latches (Figure 2-11, B) on the center slide bars, ensure that the safety latch on the extension rail assemblies are centered and slide the server all the way into the rack cabinet.

   Note: When you first slide the server into the rack cabinet, extra pressure may have to be applied. After the first time, the slides will move easier.

3. Check that the server slides in and out of the rack cabinet. Grasp the two handles on the front of the server and slowly pull the server out and push it back in.
4. Secure the faceplate of the server to the front of the rack cabinet by screwing the thumbscrews into the cage nuts.

Installing the Cable Retention Arm Assembly

The hinged cable retention arm attaches to the rear of the server and the rack cabinet rear rail and allows cables to swing in and out of the way as the server slides back and forth within the rack cabinet. All the server cables can be tie-wrapped to the cable retention arm.

> ***Note:*** For easy installation of the cable retention arm, first slide the server into the rack cabinet and then install the cable retention arm.

1. Refer to Figure 2-12. Using two screws attach the end of the cable arm assembly (B) to the cable arm bracket (A) located at the rear of the server (C).

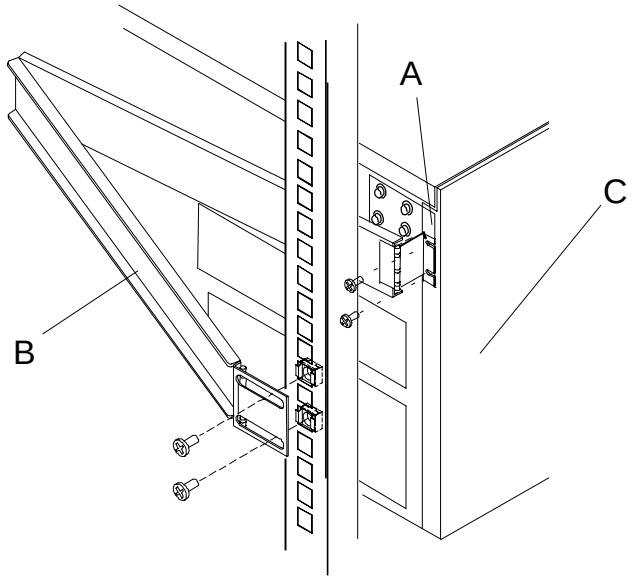


Figure 2-12. Attaching the Cable Arm Assembly to the Server

2. Using two screws attach the other end of the cable retention arm to the cage nuts installed in the right rear vertical mounting rail.
3. Bundle all the server cables together and tie-wrap them to the cable retention arm. See Figure 2-13.

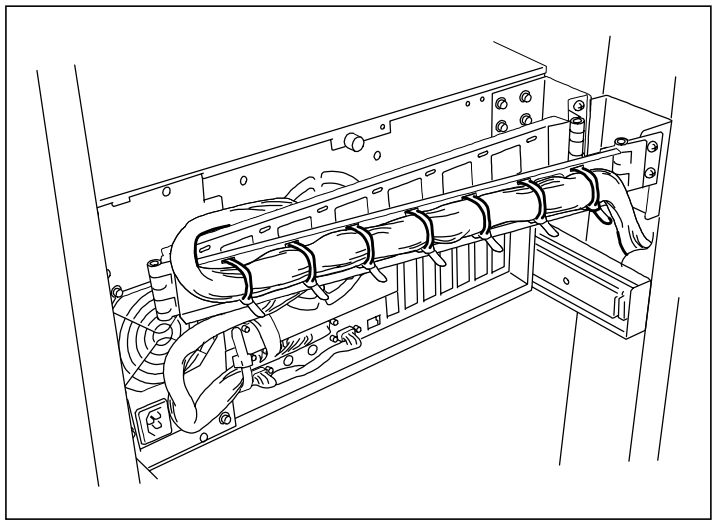


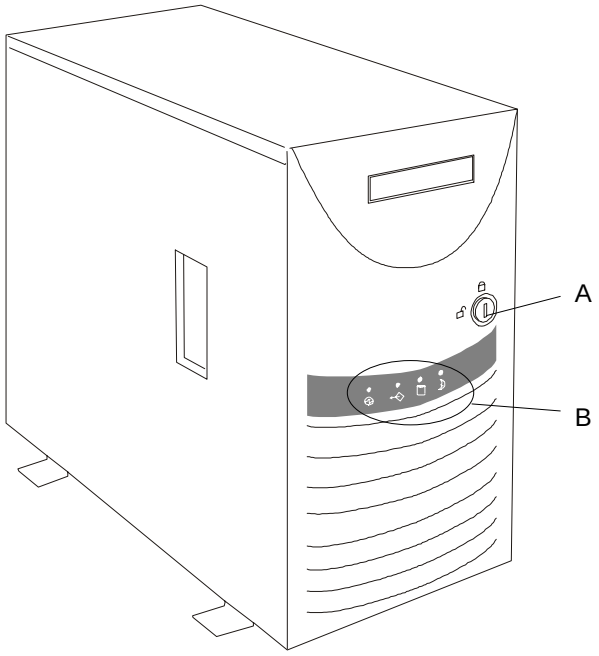
Figure 2-13. Attaching Cables to the Cable Arm Assembly

Getting Familiar with the System

Before setting up your system, you should become familiar with the system's features, such as the location of your system's front and rear panel switches, indicators and connectors, etc. Note that this section describes the tower-based system controls (switches and indicators) and connectors, which are identical for the rack-mount system.

Front View with Front Door Closed

Figure 2-14 shows the location of the front system features (tower-based system only).



A.	Keylock	When locked, secures the front door not allowing access to the front system controls.
B.	System indicators	Refer to Figures 2-16 in this chapter.

Figure 2-14. Tower System Front Features

Opening the Front Door

Refer to the Figure 2-15 and open the front door of the cabinet as follows (tower-based system only).

1. If the front door is locked, unlock it.
2. Grasp the indentation located on the right edge of the front door and pull the door towards you to open it.

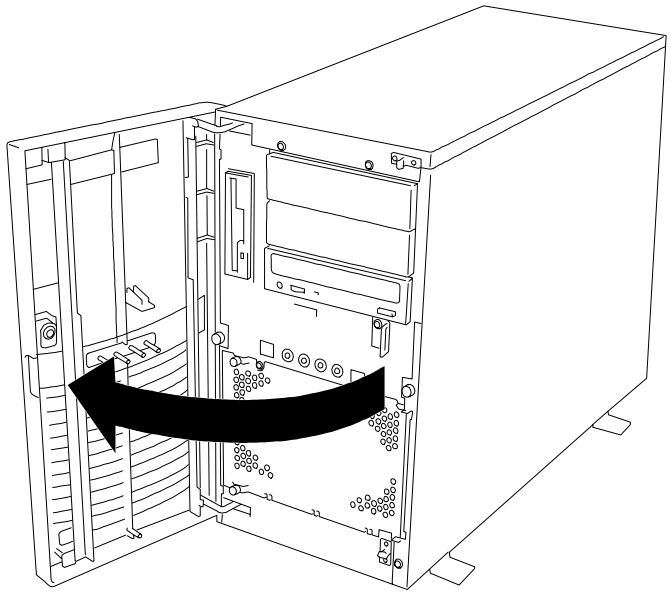
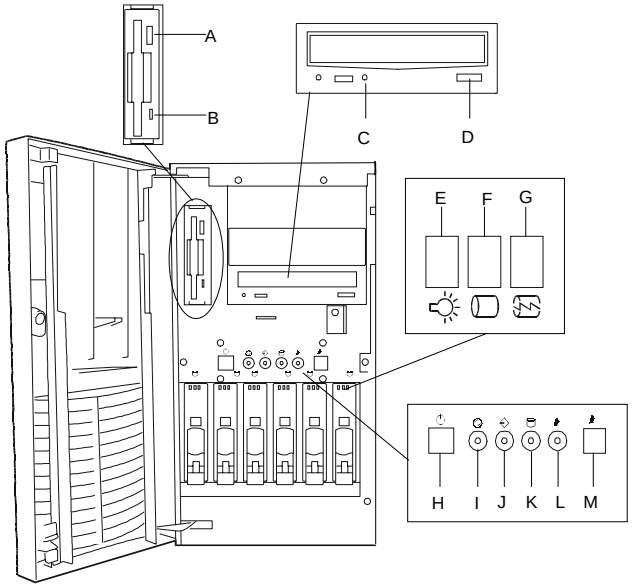


Figure 2-15. Opening the Front Door

Front View

Figure 2-16 shows the location of the front system controls and indicators on a system that includes the hot-swap SCSI disk drive bays.



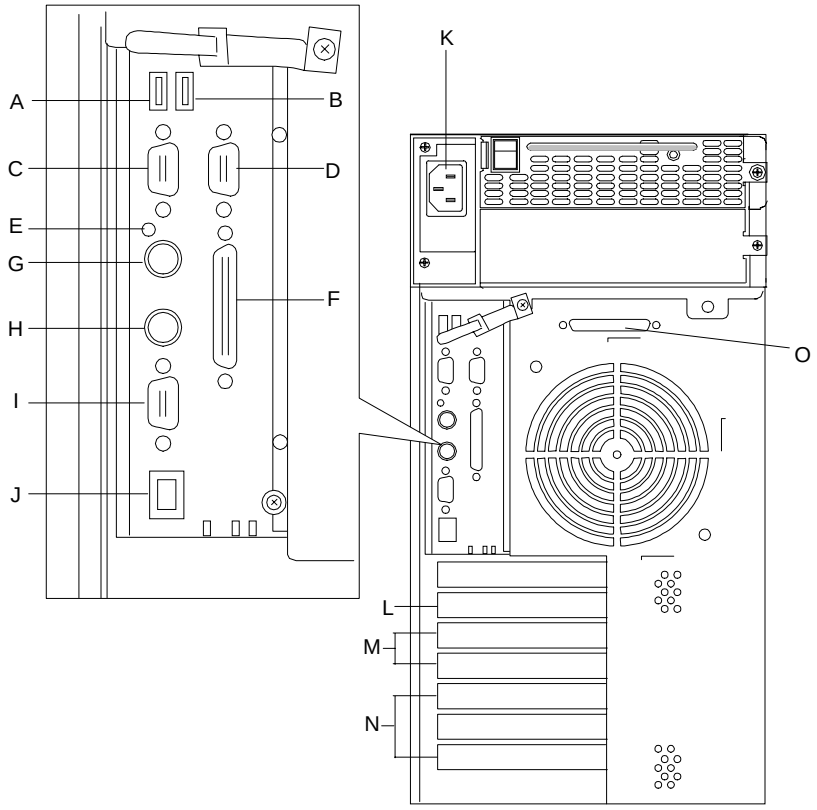
A.	Eject button, 3 ½-inch diskette drive	Press to eject diskette.
B.	Activity light, 3 ½-inch diskette drive	When lit, diskette is in use.
C.	Activity light, CD-ROM reader	When lit, CD-ROM reader is in use.
D.	Load/eject button, CD-ROM reader	Press to load CD and eject CD.
E.	Drive Present LED	When green, drive is present. See Table 2-2.
F.	Drive Activity LED	When green, Drive is active. See Table 2-2.
G.	Drive Status LED	*Indicates drive failure. See Table 2-2.
H.	DC power ON/OFF Button	Press to turn system DC power on or off.
I.	DC Power ON/OFF LED	When green, power is present in system. When off, power is turned off, power source is disrupted, or system is in the sleep mode. See Table 2-1 for a list and description of the system LEDs.
J.	Intrusion Indicator LED	When OFF, the system is OK. See Table 2-1 for a list and description of the system LEDs.
K.	Disk Fault LED	When lit, a disk drive fault occurred. See Table 2-1 for a list and description of the system LEDs.
L.	Sleep Status LED	When lit, system is in Sleep Mode. See Table 2-1 for a list and description of the system LEDs.
M.	Sleep Button	Press to enter power saving (sleep) mode. Press again to enter normal mode of operation. This function requires a corresponding operating system.

*Disk array configuration only.

Figure 2-16. Front System Features and Controls (Hot-Swap Bays)

Rear View

Figure 2-17 shows the location of the rear system features and controls.



A.	USB2 connector	Second USB connector (Black)
B.	USB1 connector	First USB connector (Black)
C.	Serial Port B	COM2 serial port 9-pin connector (Turquoise)
D.	Serial Port A	COM1 serial port 9-pin connector (Turquoise)
E.	Dump button	Reserved for debug
F.	Printer port (Burgundy)	Parallel port 25-pin connector (Burgundy)
G.	Keyboard port	PS/2-compatible 6-pin mini-DIN connector (Purple)
H.	Mouse port	PS/2-compatible 6-pin mini-DIN connector (Green)
I.	SVGA connector	SVGA monitor 15-pin connector (Blue)
J.	LAN connector	RJ-45 Ethernet connector
K.	AC input power connector	*Supplies AC power to the power supply.
L.	33 MHz, 32-bit PCI Slot	One 33 MHz, 32-bit PCI add-in board slot location
M.	66 MHz, 64-bit PCI Slots	Two 66 MHz, 64-bit PCI add-in board slot locations
N.	33 MHz, 32-bit PCI Slots	Three 33 MHz, 32-bit PCI add-in board slot locations
O.	Wide Ultra 2 SCSI Connector	Connects to External SCSI Devices

*The power supply shown may differ from the power supply in your server

Figure 2-17. Rear Features and Controls

Status LED Indicator Descriptions

Table 2-1 lists the system status LED indicators along with a description of each LED indicator. Table 2-2 lists the disk drive status LED panel indicators along with a description of each LED indicator. Refer to Figure 2-16 for the location of the LED indicators listed in Tables 2-1 and 2-2.

Table 2-1. System Status LED Indicators

LED	Status	Description	Response
DC Power Status	Off	Power OFF	None required (normal)
	Green	Power ON	None required (normal)
Intrusion	Off	No intrusion	None required (normal)
	Flashing Amber	Chassis Intrusion	Check condition
*Disk Fault	Off	No disk fault	None required (normal)
	Amber	Internal disk drive failure	Check disk drive status LEDs
Sleep Status	Off	System in Normal mode	None required (normal)
	Amber	**System power saving (sleep) mode.	Press Sleep button to return to Normal mode.

*Hot-swap chassis and disk array configuration only.
**This function requires specific operating system support.

Table 2-2. *Disk Drive Status LED Panel Indicators

LED	Status	Description	Response
Disk Drive Present	Off	Disk drive not present	None required (normal)
	Green	Disk drive present	None required (normal)
Disk Drive Activity	Off	Not accessing disk drive	None required (normal)
	Green	Accessing disk drive	None required (normal)
**Disk Drive Status	Off	No alarms	None required (normal)
	Amber (Steady light)	Disk drive failure	Replace disk drive
	(Flashing light)	Rebuilding data (in disk array configuration only)	None required (normal)

* Hot-swap disk drive cage only. See Figure 2-16.
** Disk array configuration only

Making Connections

If your system normally operates without a video display or keyboard (for example, as a network server), you must install a video display and keyboard to configure the system. You may remove them after running the BIOS Setup Utility. For information on running the BIOS Setup Utility, refer to Chapter 3 "Configuring Your System" of this User's Guide.

Refer to Refer to Figure 2-18 and connect your keyboard, monitor, and mouse. Connect any external peripheral devices such as a printer or modem by following the instructions included with these devices.

⚠ CAUTION

Damage to the system may result if the keyboard/mouse cable is inserted or removed when power is applied to the system.

Inserting a telephone line connector into a LAN board RJ-45 port may result in personal injury and equipment damage.

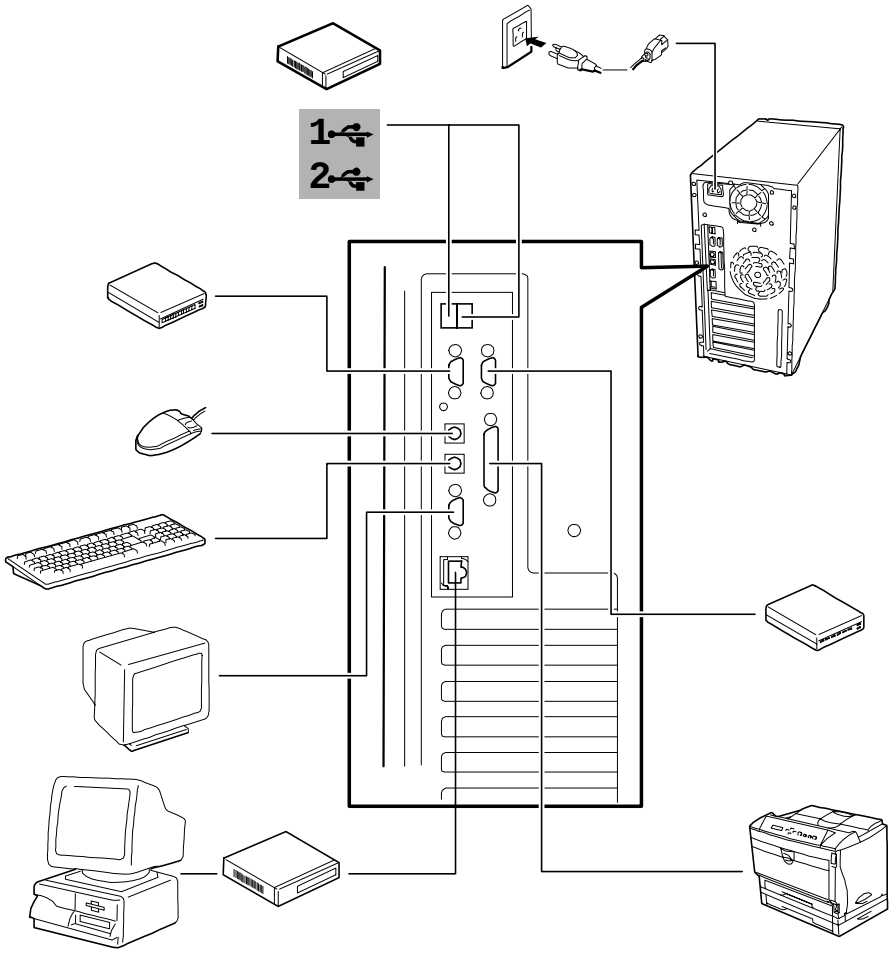


Figure 2-18. Making Connections

Connecting the Power Cord

Plug the female end of the AC power cord into the input receptacle on the rear of the power supply cage. Plug the male end of the power cord into NEMA 5-15R outlet for 100-120 VAC or NEMA 6-15R outlet for 200-240 VAC.

If the power cord supplied with the system is not compatible with the AC wall outlet in your region, obtain a suitable power cord that meets the following criteria.

- The power cord must be rated for the available AC voltage and have a current rating that is at least 125% of the current rating of the system.
- The power cord connector that plugs into the wall outlet must be terminated in a grounding-type male plug designed for use in your region. It must have certification marks showing certification by an agency acceptable in your region.
- The power cord connector that plugs into the system must be an IEC- type CEE-22 female connector.
- The power cord must be less than 1.8 meters (6.0 feet) long.

When connecting the power cord to a power control unit such as an UPS, confirm that the power control unit is powered OFF. Connecting the power cord while power is supplied to the power control unit may cause a failure.

⚠ WARNING

Your system shipped with a power cord for the power supply. Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

Powering On Your System

Power on your system as follows.

1. Make sure all external devices, such as a video display, keyboard, and mouse (optional) have been connected, and the power cords are connected.
2. Power on the video display and any other external devices.
3. Press the power on/off switch on the power supply. The power supply on/off switch is located on the system rear panel.
4. Open the front door and press the push-button power on/off switch on the front panel. Verify that the system power-on LED is lit. If it is not lit, ensure the ac power cord is connected to a functional ac power source.

After a few seconds your system begins the internal Power-On Self Tests (POST). POST automatically checks the system board, CPU module, memory, keyboard, and most installed peripheral devices.

⚠ CAUTION

Always allow POST to complete before powering down your system.

⚠ CAUTION

The server management logic on your system board monitors and logs system voltage changes. When powering down your system you may experience a 1–5 second delay from the time you press the push-button power on/off switch on the front panel and your system powering down. This is normal system operation and is required by the server management logic.

If you have problems powering on your system, refer to *Problem Solving* in Chapter 5 of this User's Guide.

After you have successfully powered on your system, insert the ExpressBuilder CD-ROM into the CD-ROM device, reboot the system and follow the screen prompts to run ExpressBuilder.

3

Configuring Your System

- Configuring Your System
- BIOS Setup Utility
- Adaptec SCSI Utility
- Configuring the RAID Controller
- Configuring System Board Jumpers

Configuring Your System

Configuration and setup utilities are used to change your system configuration. You can configure your system, as well as option boards you may add to your system, using the BIOS Setup Utility. Several unique system parameters are configured using the BIOS Setup, which is stored in the system FLASH memory.

The Adaptec Configuration Utility detects the SCSI host adapters on the system board. Use this utility if you need to configure the two SCSI controllers in your system or to perform a SCSI disk format or verify disk operation on the SCSI disk drives. The Adaptec Configuration Utility is also used to configure any SCSI removable media devices installed in your system.

If your system has been factory configured, the BIOS Setup or Adaptec Configuration Utility do not need to be run unless you want to change the password or security features, add certain types of option boards or devices, or upgrade your system board.

This chapter also provides information on several system configuration parameters that are set by jumpers on the system board. However, these parameters do not usually require change.

Use the EXPRESSBUILDER CD-ROM to create the device driver diskettes.

BIOS Setup Utility

The BIOS Setup Utility is used to change system configuration parameters. The utility is resident in the system FLASH memory and does not require a diskette or an operating system present to run.

Using the BIOS Setup Utility

You access the BIOS Setup utility when you turn on or reboot your system. To run the BIOS Setup Utility, perform the following procedure:

1. Power-on or reboot the system. “Press <F2> to enter SETUP” displays.
2. Press **F2**. The BIOS Setup Utility starts and the Main Menu is displayed. The menu bar at the top of the Main Menu lists the following selections:

Menu	Use
Main	Use this menu for basic system configuration.
Advanced	Use this menu for setting the Advanced Features available on your system.
Security	Use this menu to set User and Supervisor Passwords and the Backup and Virus-Check reminders.
System Hardware	Use this menu for configuring unique Server features.
Boot	Use this menu to configure Boot Device priority.
Exit	Exits the current menu.

Use the arrow keys to select a menu or an item on a displayed menu. Press the value keys (listed in the table below) to cycle through the allowable values for the selected field. Use the Exit menu’s “Save Values” selection to save the current values on all the menus.

To display a submenu, position the cursor on a selection that has a submenu and press **ENTER**. An arrow precedes selections with submenus.

Refer to the following table for information on the keys that you use with BIOS Setup. These keys are also listed at the bottom of the Setup menu.

Key	Function in Setup Menu
F1 or Alt-H	Get Help about an item.
ESC	Exit the current menu and return to the previous menu.
Left or right arrow keys	Move between menus.
Up or down arrow keys	Move cursor up and down. The cursor moves only to the settings that you can change.
HOME or END	Move cursor to top or bottom of window.
PAGE UP or PAGE DOWN	Move cursor to next or previous page.
F5 or -	Select the previous value for the field.
F6 or + or SPACE	Select the next value for the field.
F9	Load default configuration values for this menu.
F10	Save configuration values and exit.
ENTER	Execute command or Select ➨ submenu.

BIOS Setup Configuration Settings

The BIOS Setup Configurations tables show the default settings for the BIOS Setup Utility and provides a place for you to record any changes you make to these settings. Recommended values are bold in the following tables.

Main Menu

Feature	Choices or Display Only	Description	Your Setting
Processor Type	————————	(Display Only). Shows the type of processor installed.	
Processor Speed	XXX	(Display Only). Indicates the processor speed.	
Cache RAM	XXX KB	(Display Only). Indicates the cache RAM size.	
System Memory	XXX KB	(Display Only). Indicates the total capacity of the basic memory.	
Extended Memory	XXXXXX KB	(Display Only). Indicates the total capacity of the extended memory.	
Language	**English (US)** French, German Spanish, Italian	Selects which language BIOS displays. Note: This feature *immediately* changes to the language BIOS selected.	
BIOS Version	————————	(Display Only). Indicates the version of the system BIOS.	
System Time	HH:MM:SS	Sets the system time (hour, minutes, seconds, on 24 hour clock).	
System Date	MM/DD/YYYY	Sets the system date (month, day, year).	
Diskette A	1.44/1.25 MB 3.5"	Selects the diskette type. Note that 1.25 MB, 3.5 inch references a 1024 byte/sector Japanese media format. To support this type of media format requires a 3.5 inch 3-mode diskette drive.	

Advanced Menu

Feature	Description	Your Setting
Advanced	Refer to Advanced Submenu.	
Memory Reconfiguration	Refer to Memory Reconfiguration Submenu.	
CPU Reconfiguration	Refer to CPU Reconfiguration Submenu.	
Peripheral Configuration	Refer to Peripheral Reconfiguration Submenu.	
Monitoring Configuration	Refer to Monitoring Configuration Submenu. It sets POST Monitoring and Boot Monitoring.	
PCI Device	Refer to PCI Device Submenu.	
Option ROM	Refer to Option ROM Submenu. It Disables/Enables the Option ROM BIOS on the PCI Bus.	
Numlock	Refer to Numlock Submenu. It selects Keyboard Options.	

Advanced Submenu

Feature	Choices or Display Only	Description	Your Setting
Installed O/S	Other **PnP O/S**	Select the operating system installed on your system that will be used most of the time. Note: An incorrect setting can cause some operating systems to display unexpected behavior.	
Reset Configuration Data	**No** Yes	Select Yes if you want to clear the Extended System Configuration Data (ESCD) area.	
Boot-time Diagnostic Screen	**Disabled** Enabled	Disables or enables display of the diagnostic screen during boot instead of the NEC logo. The Boot-time diagnostic screen is automatically enabled if redirection or RomPilot is enabled.	
RomPilot Support	**Disabled** Enabled	Disables or enables RomPilot support. The Boot-time diagnostic screen is enabled if RomPilot is enabled. (See Appendix B for more details.)	
Post Error Pause	Disabled **Enabled**	Disables or enables a pause during system bootup if an error occurs. If Enabled and an error occurs, the bootup sequence pauses and offers the choice of entering BIOS Setup or resuming the boot sequence. If Disabled, the system always continues to bootup.	

Memory Reconfiguration Submenu

Feature	Choices or Display Only	Description	Your Setting
DIMM #1 Status	Normal*	(Display Only)	
DIMM #2 Status	Normal*	(Display Only)	
DIMM #3 Status	Normal*	(Display Only)	
DIMM #4 Status	Normal*	(Display Only)	
Clear DIMM Errors	Press **ENTER**	Clears the DIMM group error status information.	
DIMM Error Pause	Enabled **Disabled**	The POST operation pauses if a DIMM error occurs.	

*Possible Values: Normal, None, or Error.

CPU Reconfiguration Submenu

Feature	Choices or Display Only	Description	Your Setting
CPU #1 Status	Normal*	(Display Only)	
CPU #2 Status	Normal*	(Display Only)	
Clear CPU Errors	Press **ENTER**	Clears the CPU error information.	
CPU Error Pause	Enabled **Disabled**	The POST operation pauses if a CPU error occurs.	

*Possible Values: Normal, None, or Error.

Peripheral Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
Serial Port 1: (COM 1)	Disabled 3F8, IRQ3 **3F8, IRQ4** 2F8, IRQ3 2F8, IRQ4 3E8, IRQ3 3E8, IRQ4 2E8, IRQ3 2E8, IRQ4 Auto	Disables serial port 1 or selects the base address and interrupt (IRQ) for serial port 1.	
Serial Port 2: (COM 2)	Disabled 3F8, IRQ3 3F8, IRQ4 **2F8, IRQ3** 2F8, IRQ4 3E8, IRQ3 3E8, IRQ4 2E8, IRQ3 2E8, IRQ4 Auto	Disables serial port 2 or selects the base address and interrupt (IRQ) for serial port 2.	
Parallel Port	Disabled 378, IRQ5 **378, IRQ7** 278, IRQ5 278, IRQ7 3BC, IRQ5 3BC, IRQ7 Auto	Disables the parallel port or selects the base address and interrupt (IRQ) for the Parallel port.	
Parallel Mode	Output only Bi-directional EPP ECP, DMA1 **ECP, DMA3**	Selects the parallel port operation mode.	
Diskette Controller	Disabled **Enabled**	Configure using these options: (Disabled) No configuration. (Enabled) User configuration	

Peripheral Configuration Submenu (Continued)

Feature	Choices or Display Only	Description	Your Setting
Mouse	Disabled Enabled **Auto Detect**	*Disabled* prevents any installed PS/2 mouse from functioning, but frees up IRQ12. *Enabled* forces the PS/2 mouse port to be enabled regardless if a mouse is present. *Auto Detect* enables the PS/2 mouse only if present. *OS Controlled* is displayed only if the OS controls the mouse.	
USB Controller	**Disabled** Enabled	Disables or enables on-board USB controller.	

Monitoring Configuration Submenu

Feature	Choices or Display Only	Description	Your Setting
POST Monitoring	Disabled OptROM-END **POST-END**	Selects the point where the POST monitoring checkpoint is.	
Boot Monitoring	**Disabled** Enabled	Disable or enable the boot monitoring feature.	

PCI Device Submenu

Feature	Choices or Display Only	Description	Your Setting
PCI IRQ1 — PCI IRQ14	Disabled **Auto Select** IRQ3 IRQ4 IRQ5 IRQ6 IRQ7 IRQ9 IRQ10 IRQ11 IRQ12 IRQ13 !RQ14	PCI devices use hardware interrupts called IRQs. A PCI device cannot use IRQs already in use by ISA devices. Use"Auto" only if no ISA legacy cards are installed.	

Option ROM Submenu

Feature	Choices or Display Only	Description	Your Setting
Onboard SCSI	**Enabled** Disabled	Disables/Enables the mapping of the onboard SCSI BIOS.	
Onboard LAN	**Enabled** Disabled	Disables/Enables the mapping of the onboard LAN BIOS	
PCI Slot 1	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 2	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 3	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 4	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 5	**Enabled** Disabled	Initializes Device Expansion ROM	
PCI Slot 6	**Enabled** Disabled	Initializes Device Expansion ROM	

Numlock Submenu

Feature	Choices or Display Only	Description	Your Setting
Numlock	**Auto** On OFF	Selects the power-on state for Numlock.	
Key Click	**Disabled** Enabled	Disables or enables keyclick.	
Keyboard Auto-repeat Rate	2/sec 6/sec **10/sec** 13.3/sec 18.5/sec 21.8/sec 26.7/sec 30/sec	Selects key repeat rate.	
Keyboard Auto-repeat Delay	0.25 sec 0.5 sec 0.75 sec **1 sec**	Selects delay before key repeat.	

Security Menu

Note: Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case sensitive.

Feature	Choices or Display Only	Description	Your Setting
Supervisor Password is	**Clear**	Status only, user cannot modify. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (see System Board Jumpers in this Chapter).	
User Password is	**Clear**	Status only, user cannot modify. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (see System Board Jumpers in this Chapter).	
Set Supervisor Password	Press **ENTER**	Supervisor password controls access to the setup utility. When the <Enter> key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to System Board Jumpers in this chapter).	
Set User Password	Press **ENTER**	When the <Enter> key is pressed, the user is prompted for a password; press ESC key to abort. Once set, this can be disabled by setting it to a null string, or by clearing password jumper on system board (refer to System Board Jumpers in this chapter).	
Password on Boot	**Disabled** Enabled	Disables or enables password entry on boot.	
Diskette Access Secure Mode	**Everyone** Supervisor	Controls access to diskette drives.	
Power Switch Mask	Masked **Unmasked**	Determines whether power switch is masked or unmasked.	
Option ROM Menu Mask	**Unmasked** Masked	Determines whether Option ROM Menu Mask is masked or unmasked.	
Processor Serial Number	**Disabled** Enabled	Determines whether Processor Serial Number feature is enabled or disabled.	

System Hardware Menu

Feature	Choices or Display Only	Description	Your Setting
Thermal Sensor		Refer to Thermal Sensor Submenu.	
Wake On Events		Refer to Wake On Events Submenu.	
AC Link	Power On **Last State** Stay Off	Determines the mode of AC Link.	
ESM IRQ	Disabled IRQ5 IRQ10 **IRQ11**	Determines routing of the ESM interrupt.	
Error Log Initialization	Press **Enter**	Request to initialize the Error Log now. If *Clear OK*, then display "System Event Log Cleared!" If *Clear NG*, then display "System Event Log Not Cleared!"	
Console Redirection		Additional setup menu to configure console. The Boot-Time diagnostic screen is enabled if redirection is enabled.	

Thermal Sensor Submenu

Feature	Choices or Display Only	Description	Your Setting
Thermal Sensor	**Enabled** Disabled	When enabled determines if the BIOS will disable boot (if temperature is not within a safe range).	
Upper Limit	50	Sets the upper temperature limit in centigrade.	
Lower Limit	5	Sets the lower temperature limit in centigrade.	

Wake On Events Submenu

Feature	Choices or Display Only	Description	Your Setting
Wake On LAN	**Enabled** Disabled	Enables Wake ON LAN support.	
Wake On Ring	**Enabled** Disabled	Enables Wake ON Ring support.	

Console Redirection Submenu

Feature	Choices or Display Only	Description	Your Setting
Serial Port Address	**Disabled** Serial Port 2 (3F8h/IRQ4) Serial Port 2 (2F8h/IRQ3)	If enabled, the console will be redirected to this port. If console redirection is enabled, this address must match the settings of serial port 2.	
Baud Rate	57.6K **19.2K**	Enables the specified baud rate.	
Flow Control	No Flow Control **XON/XOFF**	Enables flow control.	
Console Connection	**Direct** Via Modem	Indicate whether the console is connected directly to the system or a modem is used to connect.	

Boot Menu

Use the up or down arrow keys to select a device, then press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Boot Device Priority Menu

Boot Priority	Device	Description	Your Setting
1.	Diskette Drive	Attempts to boot from a diskette drive.	
2.	ATAPI CD-ROM Drive	Attempts to boot from an ATAPI CD-ROM drive.	
3.	Hard Drive	Attempts to boot from a hard drive device.	
4.	Intel UNDI, PXE-2.0 (Build 071)	Attempts to boot from diagnostic boot partition of the flash memory.	

Exit Menu

You can make the following selections on the Exit Menu. Select an option using the up or down arrow keys, then press <Enter> to execute the option. Pressing <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Exit Menu

Choices	Description
Save Changes and Exit	Exits System Setup after saving all changes to CMOS.
Exit Without Saving Changes	Exits System Setup without saving setup data to CMOS.
Get Default Value	Loads default values for all Setup items.
Load Previous Values	Loads previous values of all Setup items.
Save Changes	Writes all Setup item values to CMOS.

Adaptec SCSI Utility

The Adaptec SCSI Utility detects the SCSI host adapters on the server board.

Use the Adaptec SCSI Utility to:

- Change default values
- Check and/or change SCSI device settings that may conflict with those of other devices in the server

Running the SCSI Utility

You access the Adaptec SCSI Utility when you turn on or reboot your system.

To run the Adaptec SCSI utility, perform the following procedure:

1. Power-on or reboot the system.
2. When this message appears on the video monitor:

   Press Ctrl-A to run SCSI Utility...

3. Press **Ctrl+A** to run this utility. When it appears, choose the host adapter that you want to configure.
4. The SCSI utility starts. When the Adaptec SCSI Utility detects more than one AIC-78xx host adapter, it displays a selection menu listing the bus and device number of each adapter. When the selection menu appears, select the channel you wish to configure as follows:

Bus : Device : Channel	Selected SCSI Adapter
01 : 04 : A*	AIC7899
01 : 04 : B	AIC7899

*Internal SCSI connector.

5. Once you select the adapter, the following screen is displayed:

Menu	Description
Configure/View Host Adapter Settings	Configure host adapter and device settings.
SCSI Disk Utilities	The utility scans the SCSI bus for SCSI devices, reports a description of each device. Run these utilities *before* configuring SCSI devices.

6. If you wish to format a disk, verify disk media, or display a list of devices and their SCSI IDs, select “SCSI Disk Utilities”. If you wish to configure the adapter or a device, select “Configure/View Host Adapter Settings”.

Adaptec SCSI Utility Configuration Settings

The following keys are active for all Adaptec SCSI Utility screens:

Key	Action
Arrows	Up and down arrows move from one parameter to another within a screen.
ENTER	Displays options for a configurable parameter. Selects an option.
ESC	Moves back to previous screen or parameter or EXIT if at the Main menu.
F5	Switches between color and monochrome.
F6	Resets to host adapter defaults.

The following table shows the normal settings for the Adaptec SCSI Utility and provides a place for you to record any changes you make to these settings.

Table 3-1. Adaptec SCSI Utility Setup Configurations

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
SCSI Bus Interface Definitions		
Host Adapter SCSI ID	7	
SCSI Parity Checking	Enabled	
Host Adapter SCSI Termination	Enabled	
Additional Options		
Boot Device Options	Press ENTER for menu	
Boot Channel	A First	
Boot SCSI ID	0	
Boot LUN Number	0	
SCSI Device Configuration	Press ENTER for menu	
Sync Transfer Rate (MB/Sec)	160	
Initiate Wide Negotiation	Yes	
Enable Disconnection	Yes	
Send Start Unit Command	Yes	
Enable Write Back Cache	N/C	
BIOS Multiple LUN Support	No [1]	
Include in BIOS Scan	Yes [1]	
Advanced Configuration Options	Press ENTER for menu.	
Plug and Play SCAM Support	Disabled	
Reset SCSI Bus at IC Initialization	Enabled	

[1] No effect if BIOS is disabled.

Table 3-1. Adaptec SCSI Utility Setup Configurations (Continued)

OPTION	RECOMMENDED SETTING OR DISPLAY ONLY	YOUR CONFIGURATION
Display <Ctrl-A> Messages During BIOS Initialization	Enabled	
Extended BIOS Translation for DOS Drives >1 GByte	Enabled	
Verbose/Silent Mode	Verbose	
Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled[1]	
Domain Validation	Enabled	
Support Removable Disks Under BIOS as Fixed Disks	Disabled[1, 2]	
BIOS Support for Int13 Extensions	Enabled[1]	

[1] No effect if BIOS is disabled.
[2] Do not remove media from a removable media drive if it is under BIOS control.

Exiting Adaptec SCSI Utility

To exit the Adaptec SCSI Utility, press ESC until a message prompts you to exit (if you changed any settings, you are prompted to save the changes before you exit).

Configuring the RAID Controller

The RAID (Redundant Array of Inexpensive Devices) options available for your system are the single channel SecuRAID 110 (Mylex AcceleRAID 150) RAID controller, which gives your system the added security of fault tolerance.

If you order a system with a RAID controller, the system is pre-configured at the factory according to the Table below.

Table 3-2. RAID Configurations

Number of Hard Drives	RAID Level Configured	Hard Drives in Array	Description
1	7	1	**JBOD (RAID 7)** Known as *Just a Bunch of Drives*, JBOD allows the controller to access the drives independently. This configuration has no redundancy and does not use striping.
2	1	2	**Mirroring (RAID 1)** Drives are paired and mirrored. All data is 100% duplicated on an equivalent drive (fully redundant).
3	5	3	**Striping with Parity (RAID 5)** Data is striped across several physical drives. Parity protection is used for data redundancy.
4 or more	5	4 (one standby drive)	**Striping with Parity (RAID 5) with a standby drive** The array consists of three ON-LINE drives and one STANDBY drive. The standby replacement drive, or hot spare, is one of the most important features RAID provides to achieve automatic, non-stop service with a high degree of fault-tolerance.

If you want to change the RAID level or add additional hard disks to the array, use the RAID configuration utility. The RAID configuration utility is included with the RAID controller.

If you are adding the RAID controller to an existing system, the RAID configuration utility allows you to configure your disk array before reinstalling your network operating system. The RAID controllers support various versions of RAID technology (referred to as RAID levels). To use any RAID level, you must configure the RAID controller using the RAID configuration utility prior to installing your Network Operating System. For an explanation of this utility, refer to the documentation on the MYLEX CDROM that was shipped with the RAID controller. It describes RAID technology and provides tips on making your array perform well in your specific application. It also covers array hardware preparation, configuration, and initialization. After completing the steps in the manual, you can install your Network Operating System.

If you want to remotely configure the array (from a PC client); increase array capacity online; or monitor statistics on disk and controller activity, you must install the array manager provided with your RAID subsystem. Increasing array capacity is covered in the user's guide shipped with the option.

Configuring System Board Jumpers

Before You Begin

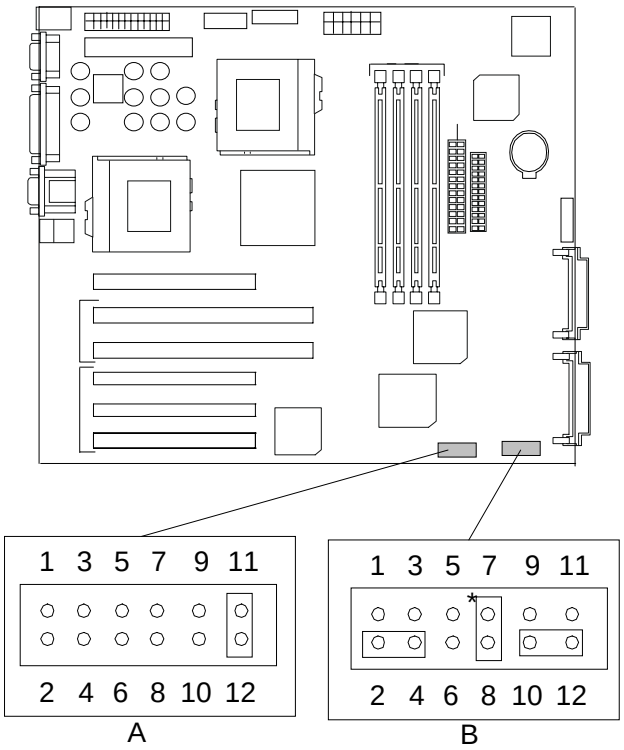
Only a qualified technical person should perform the procedures in this section.

⚠ CAUTION

Electrostatic discharge (ESD) can damage the system board. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

The system board jumpers enable you to set specific operating parameters for your system. A jumper is a small plastic-encased conductor (shorting plug) that slips over two jumper pins.

Figure 3-1 shows the location of system board jumpers. Referring to Figure 3-1, jumper A is the password/CMOS configuration jumper. Table 3-3 lists the factory default settings for the password/CMOS configuration jumper. Jumper B shown in Figure 3-1 configures additional system functions. This jumper is factory set as shown in Figure 3-1 and should not be changed. Table 3-4 lists the default settings for jumper B.



*This jumper is set to OFF if the PS2 non-hot swap power supply is installed.

Figure 3-1. System Board Jumpers

Table 3-3. Password/CMOS System Board Jumper Summary

Jumper	Function	Jumper On/Off (default in bold)	What it does at system reset.
1 - 2	CMOS clear	**Off, Protect** On, Erase	Preserves the contents of CMOS. Clears CMOS.
3 - 4	Password disable	**Off, Enable** On, Disable	Enables password protection. Disables the password.
5 - 6	Reserved	**Off, Not Used**	Required. Do Not Change.
7 – 8	Reserved	**Off, Not Used**	Required. Do Not Change.
9 – 10	Reserved	**Off, Not Used**	Required. Do Not Change.
11 - 12	Spare	Off, Not Used **On, Spare**	Provides a spare jumper.

Table 3-4. System Board Jumper Summary

Jumper	Function	Jumper On/Off (default in bold)	Description
1 - 2	Frb3stop	**Off, Normal operation** On, BMC frb3stop disabled	Required. Do Not Change.
3 - 4	Front Cover Open Sensor	**Off, Front cover open sensor enabled** On, Front cover open sensor disabled	Required. Do Not Change.
5 - 6	Side Cover Open Sensor	**Off, Side cover open sensor enabled** On, Side cover open sensor disabled	Required. Do Not Change.
7 – 8	Hot-swap Power	Off, Non-hot swap power supply installed **On, hot-swap power supply installed**	On some models this jumper is set to OFF if the PS2 non-hot swap power supply is installed.
9 – 10	SCSI Activity LED Control	**Off, 120Le Server** On, 120Ed Server	Required. Do Not Change.
11 - 12	Spare	Off, Not Used **On, Spare**	Provides a spare jumper.

Moving System Board Jumpers

⚠ CAUTION

Before doing the procedures in this section, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before moving the jumpers can result in personal injury and equipment damage.

Observe static precautions. Use an antistatic wrist strap.

To configure the system board options:

1. Power off the system and remove the left panel as described in Chapter 4 of this guide.
2. Check to ensure the system power cord is removed from the back of the system.
3. Locate the position of the jumpers on the system board you are changing. See Figure 3-1. To change a jumper setting, use a pair of needle-nose pliers or your fingers to remove the jumper from its current location. Position the jumper over the two pins for the desired setting and press it onto the pins. Be careful not to bend the pins. Refer to Table 3-3 for system board jumper settings.
4. Install the system cover and power up the system.

Clearing and Changing the Passwords

To clear and change the passwords:

1. Power off the system and remove the left side panel as described in Chapter 4 of this guide.
2. Check to ensure the system power cord is removed from the back of the system.
3. Remove the spare jumper from position 11 - 12 on jumper block.
4. Reinstall the spare jumper on position 3 - 4 (Password Disable) of the jumper block. Refer to Figure 3-1 and Table 3-3 to find the location of this jumper.
5. Connect the power cord, power on the system and while waiting for POST to complete, press the F2 key to enter BIOS setup. This automatically clears all passwords, provided you exit and save the BIOS setup.
6. Power off the system and remove the power cord.
7. Remove the Password Disable jumper from pins 3-4 and store it in position 11 - 12.
8. Replace the left side panel, connect the power cord and power on the system.
9. To specify a new password run the BIOS Setup Utility as described earlier in this chapter.

Clearing CMOS

Clear CMOS as follows.

1. Power off the system and remove the left side panel as described in Chapter 4 of this guide.
2. Check to ensure the system power cord is removed from the back of the system.
3. Remove the spare jumper from position 11 - 12 on jumper block.
4. Reinstall the spare jumper on position 1 - 2 (CMOS Clear) of the jumper block. Refer to Figure 3-1 and table 3-3 to find the location of this jumper.
5. Connect the power cord, power on the system and after POST completes, power down the system and unplug the power cord.
6. Remove the jumper from pins 1-2 and store the jumper on pins 11-12.
7. Replace the left side panel, connect the power cord and power on the system.
8. Press **F2** at the prompt to run the BIOS Setup utility, and select “Get Default Values” at the Exit menu.

4

Upgrading Your System

- General Information
- Static Precautions
- Preparing Your System for Upgrade
- Equipment Log
- Opening and Removing the Front Door
- Removing Side Panels
- Installing Side Panels
- Removing and Installing the Air Duct
- Modifying the System Board
- Option Boards
- Installing a RAID Controller Board
- Hard Disk Drives
- Removable Media Devices
- Power Supply

General Information

WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cord from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

CAUTION

The server management logic on your system board monitors and logs system voltage changes. When powering down your system you may experience a 1–5 second delay from the time you press the push-button power on/off switch on the front panel and your system powering down. This is normal system operation and is required by the server management logic.

CAUTION

Operating your system with the side panels removed can damage your system components. For proper cooling and airflow, always replace the side panels before powering on your system.

Note: Your system error log will be lost, if your system ac power source is off or disconnected.

Contact your sales representative or dealer for a list of approved optional peripheral devices.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Preparing Your System for Upgrade

Depending on the upgrade, you will need one or more of the following tools:

- Phillips screwdriver (#1 bit and #2 bit)
- Flat-head screwdriver
- Small needle nose pliers
- Pen or pencil
- ESD workstation or antistatic wrist strap (recommended)

Equipment Log

Use the equipment log form located at the end of this manual to record the model and serial number of your system, all installed options, and any other pertinent information specific to your system. You will need this information when configuring your system.

Opening and Removing the Front Door

You must open the front door to remove the side panels on your system. Perform this procedure to open and remove the front door.

1. Power off the system and ensure the power cord is unplugged from the AC wall outlet.
2. If the front door is locked, unlock it.
3. Grasp the indentation located on the right edge of the front door and pull the door towards you to open it (Figure 4-1).

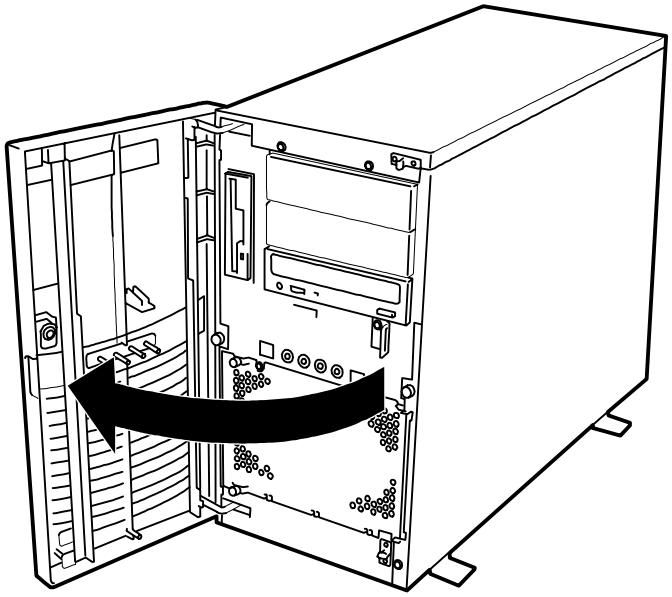


Figure 4-1. Opening the Front Door

4. To remove the front door, open it and lift the door and pull it towards you (see Figure 4-2). The mounting pins of the front door are disengaged from their mounting holes on the front of the system.

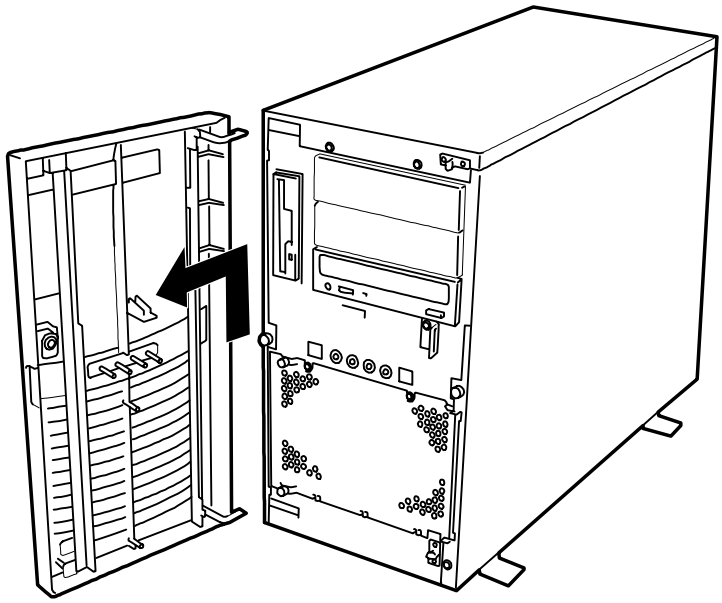


Figure 4-2. Removing the Front Door

To install the front door:

1. Position the front door so the mounting pins of the front door are aligned with their mounting holes on the front of the system. Slide the lower mounting pin into its mounting hole and then slide in the upper pin.
2. Close the front door.

Removing Side Panels

To install options in your system, you must remove the side panel on the left side of the system (as viewed from the front).

⚠ CAUTION

For proper cooling and airflow, do not operate the system with the side panels removed. Always replace the panels before powering on the system.

⚠ WARNING

If you are removing the side panel after the system is set up, you must first power off the system and all external devices and then **Unplug** the system power cord

To remove the **left** side panel:

1. Power off the system and ensure it is disconnected from the ac wall outlet.
2. Open and remove the front door following procedures in the previous section.
3. The left side panel is secured to the chassis with one thumbscrew (Figure 4-3A). Remove the screw securing the side panel. Save the screw for reattaching the side panel.
4. Using the indentation on the side of the panel, slide the side panel toward the front of the system. This unlocks the locking fingers behind the side panel.
5. Pull the side panel out and away from the chassis (Figure 4-3).

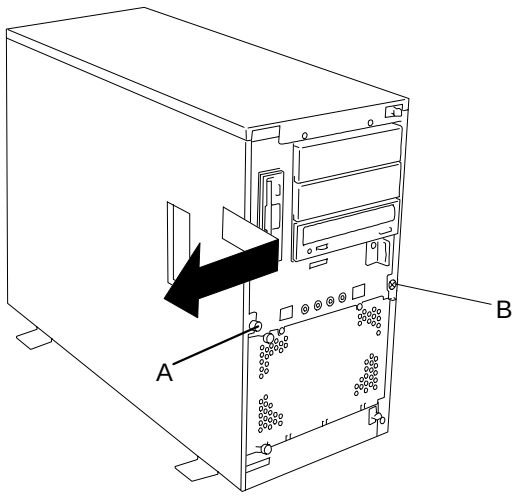


Figure 4-3. Removing the Left Side Panel

To remove the **right** side panel:

1. Power off the system and ensure it is disconnected from the ac wall outlet.
2. Open the front door following procedures described earlier in this chapter.
3. The right side panel is secured to the chassis with one Phillips head screw (Figure 4-3B). Remove the screw securing the side panel. Save the screw for reattaching the side panel.
4. Using the indentation on the side of the panel, slide the side panel toward the front of the system. This unlocks the locking fingers behind the side panel.
5. Pull the side panel out and away from the chassis

Installing Side Panels

1. Before replacing the side panel, make sure no tools or loose parts have been left inside the system chassis.
2. Make sure all option boards are firmly seated in their respective slots and that all interior cables are properly connected.
3. Insert the metal tabs on the top and bottom of the side panel into their slots on the chassis. Slide the side panel rearward as far as it will go.
4. Replace the side panel retaining screw (see Figure 4-4).
5. Replace the front door if, removed.

Note: If your system is already set up, plug the system back in, reconnect the peripherals, and power on the peripherals and system.

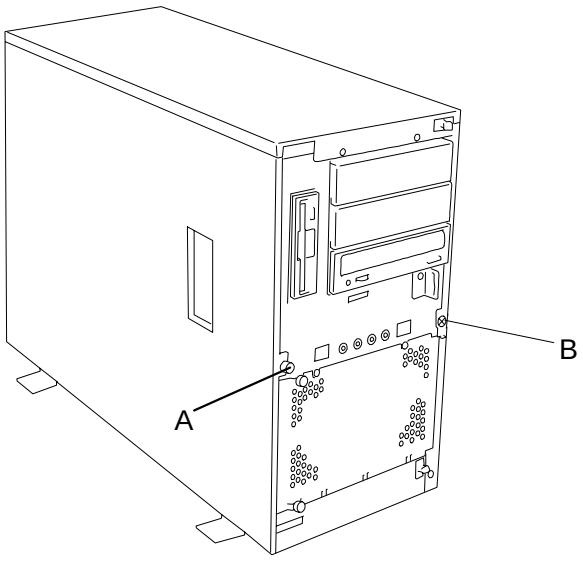


Figure 4-4. Securing a Side Panel

Removing and Installing the Air Duct

To install processor or memory options in your system, you must remove the air duct covering these components. See Figure 4-5.

⚠ CAUTION

For proper cooling and airflow, do not operate the system with the air duct removed. Always replace the air duct and the side panels before powering on the system.

To remove the air duct:

1. Power off the system and ensure it is disconnected from the ac wall outlet.
2. Open and remove the front door following procedures in the previous section.
3. Remove the left side panel as described earlier in this chapter.
4. Pull the air duct plunger (Figure 4-5, B) to release the air duct from the system chassis.
5. Pull the air duct out and away from the chassis (Figure 4-5).

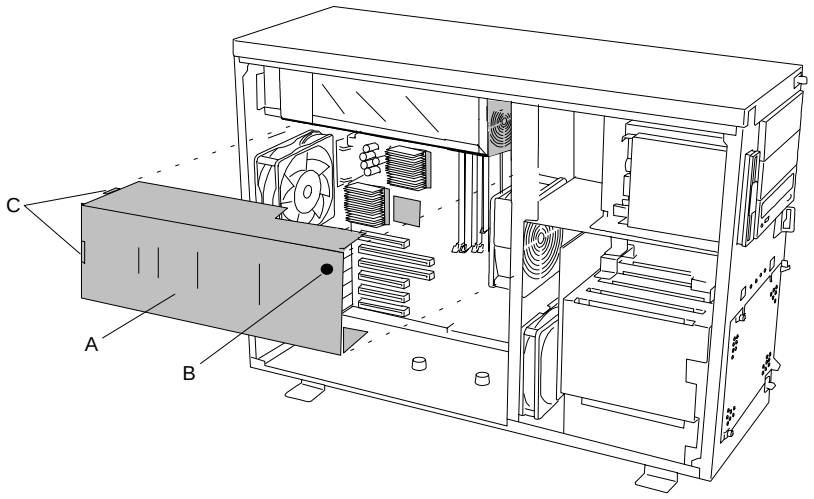


Figure 4-5. Removing the Air Duct

To install the air duct:

1. Position the air duct covering the front and rear system fans.
2. Position the air duct tabs (Figure 4-5, C) into the slots in the chassis rear panel.
3. Position the air duct plunger (Figure 4-5, B) over the locking hole in the chassis and push the plunger inwards to secure the air duct to the system chassis.

Modifying the System Board

The following sections provide procedures for upgrading and configuring the system board in your system. Topics covered include:

- Replacing the real-time clock battery
- Removing and installing a Pentium processor
- Installing or removing DIMMs.

⚠ CAUTION

Electrostatic discharge (ESD) can damage add-in boards and other components; place them on an antistatic surface. Modify the system board only at an ESD workstation. Otherwise, wear an antistatic wrist strap attached to chassis ground.

Replacing the Real-time Clock Battery

You may need to replace the real-time clock battery because of its life span. The battery (Vendor Part #CR2032) is a commodity part available through many vendors. Notice the plus (+) sign on the battery. This sign will assist you in correctly positioning the battery on the system board.

⚠ CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by manufacturer. Dispose of lithium batteries as required by local ordinance or as normal waste if no local ordinance exists. Do not expose the component to excessive heat or fire. Keep all batteries away from children

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

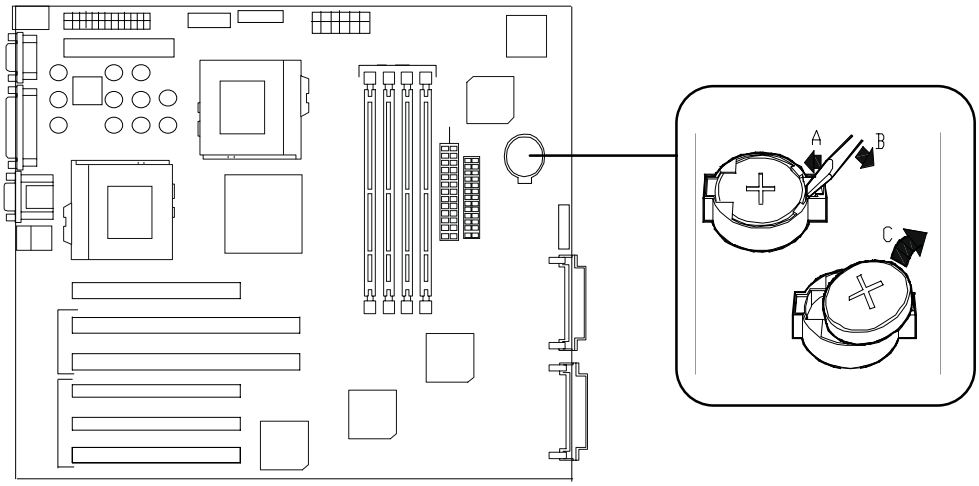


Figure 4-6. Replacing the Real-Time Clock Battery

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door.
3. Remove the left side panel and the air duct as described earlier in this chapter.
4. If present, remove the protective plastic cover located over the top of the lithium battery.
5. Insert the tip of a small flat-bladed screwdriver, or equivalent, under the plastic tab on the San-in plastic retainer.
6. Gently push down on the screwdriver to lift the battery (Figure 4-6B).
7. Remove the battery from its socket (Figure 4-6C).
8. Dispose of the battery according to local ordinance.
9. Remove the new lithium battery from its package, and, being careful to observe the correct polarity, insert it in the battery socket.
10. If applicable, reinstall the plastic cover on the lithium battery socket.
11. Replace the air duct and left side panel and the front door as described earlier in this chapter.
12. Plug in the system power cord, and turn on the system.
13. Run the BIOS Setup to restore the configuration settings to the real-time clock.

Removing and Installing a Pentium III Processor

This subsection provides the procedures for removing and installing a Pentium III processor in your system. The system board includes two Pentium III ZIF sockets. The primary processor socket is shown in Figure 4-7, A; the secondary processor socket is shown in Figure 4-7, B.

⚠ CAUTION

Electrostatic discharge (ESD) can damage components; place them on an antistatic surface. Modify the system board using an antistatic wrist strap attached to chassis ground.

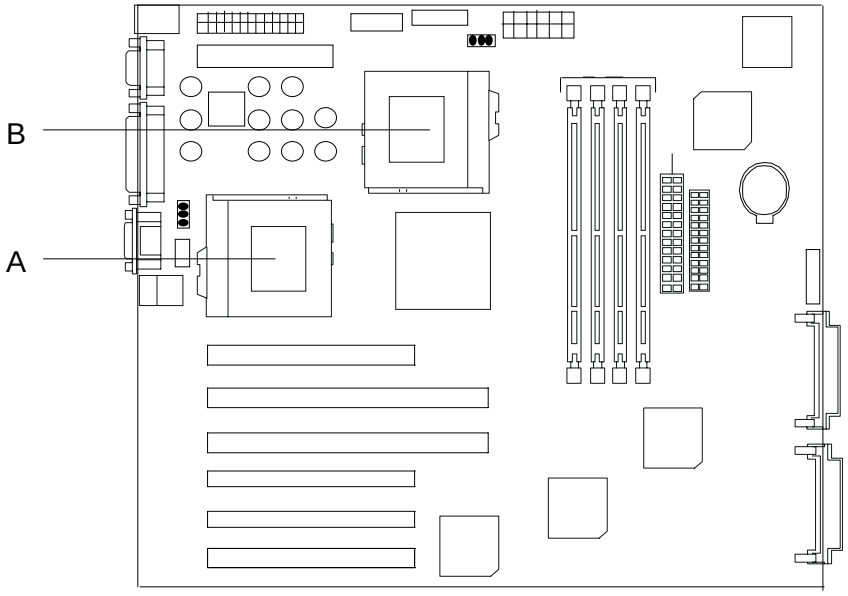


Figure 4-7. Removing and Installing a Pentium III Processor

Removing a Processor

⚠ WARNING

If the system has been running, any processor and heat sink already installed on the board will be hot. To avoid the possibility of a burn, let the components cool for 10 minutes before continuing with the procedures described here

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door and remove the left side panel and air duct as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap. Hold the processor only by its edges.

3. Press down on the heat sink clip retention latch until it springs outward from the fastener tab on the base of the ZIF socket of the processor that you are removing. See Figure 4-8.

⚠ CAUTION

When performing the remaining steps in this procedure, do not touch the thermal tape located between the heat sink and the processor as the tape is easily damaged.

4. Remove the heat sink clip by pulling it up and over the center of the heat sink and detach the small end of the clip from the tab on the base of the ZIF socket, as shown in Figure 4-8. Remove the heat sink.

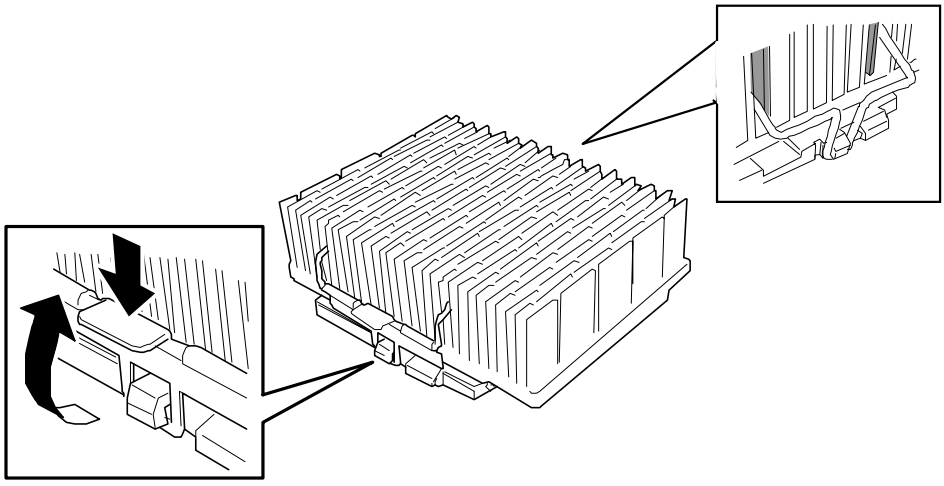


Figure 4-8. Removing the Heat Sink Clip and Heat Sink

5. Raise the ZIF socket lever to the up position. See Figure 4-9.

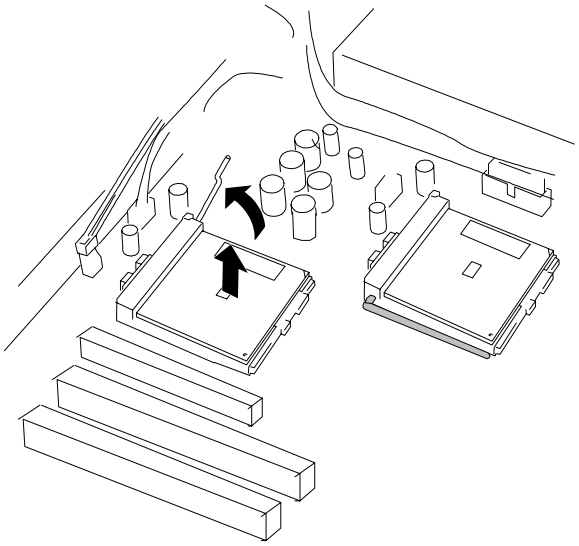


Figure 4-9. Removing the Processor

6. Grasp the opposite sides of the processor, apply equal upward force on each side and rock it from side to side until it releases.
7. Place the processor into an antistatic container.
8. If you removed a processor from the secondary socket and do not intend to replace it with a new processor, remove the VRM board from the system board VRM slot and insert a processor terminator into the secondary processor socket. See Figure 4-15.

Installing a Processor

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap. Hold the processor only by its edges.

⚠ CAUTION

Installing a second processor that is of a different type than the first processor will result in system damage. Do not touch or bend the processor's exposed pins.

Note: If you are adding a second processor to your system, you must remove the terminator from the secondary processor socket. Also, you must install a VRM into the VRM socket on the system board.

Note: If your system has one processor and you are replacing it, leave the terminator board intact in the empty secondary processor connector. Remove the processor you want to replace. A VRM should NOT be installed in systems with only one processor.

1. Perform Steps 1 through 5 described in the previous procedure, *Removing a Processor*.
2. Ensure the server is powered down and the ac cable is disconnected.
3. Raise the ZIF socket lever to the up position. See Figure 4-9.
4. If you are adding a second processor to your system, remove the terminator from the secondary processor socket.
5. Position the processor over its ZIF socket so the processor pins align with the socket holes. Note that one corner of the processor has three pins that should be positioned over the corner of the socket that has the three matching pin holes. See Figure 4-10, A.

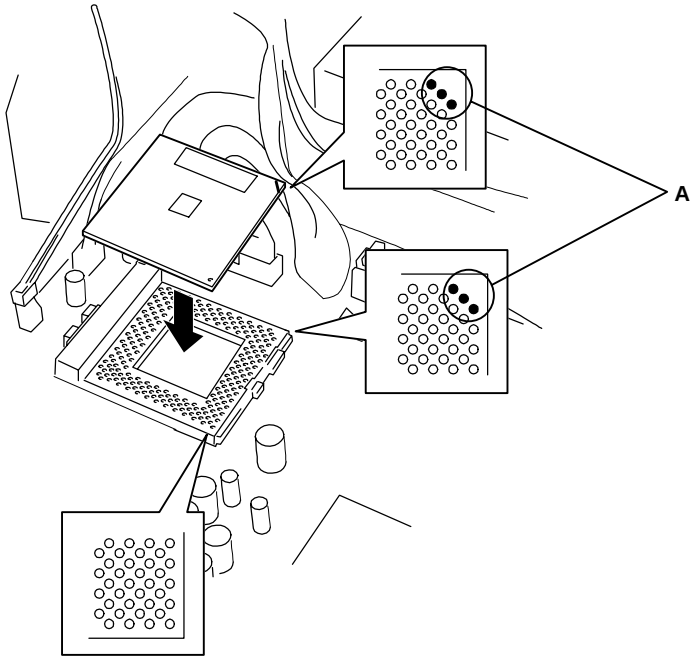


Figure 4-10. Positioning the Processor

6. Insert the processor pins into the socket. Apply pressure equally over the top surface of the processor until it seats in the socket. The processor should easily fit, do not force the processor into the socket.
7. Lower the ZIF socket lever into the locked position. See Figure 4-11.

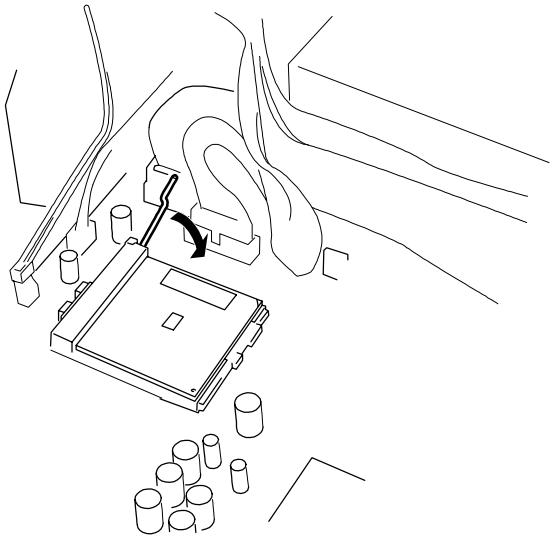


Figure 4-11. Installing the Processor

⚠ CAUTION

The thermal pad is very delicate and tears easily. Handle with extreme care. Perform the next two steps exactly as described to ensure proper heat transfer from the processor to the heat sink.

8. One side of the thermal pad is shiny metallic foil. The other side of the thermal pad is covered with a clear plastic liner. Carefully peel the liner away from the pad. The clear liner is not used and may be discarded.

9. Position the thermal pad on top of the processor with the shiny side facing down and the yellow sticky side of the pad facing up. Ensure the pad is positioned over the center of the processor as shown in Figure 4-12.

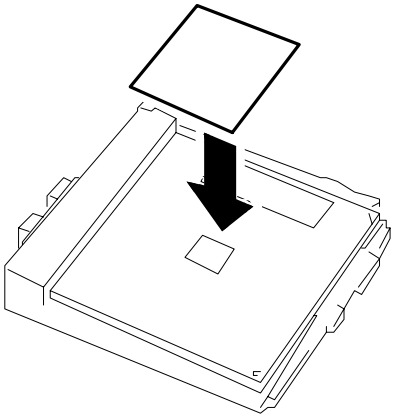


Figure 4-12. Installing Thermal Pad

10. Ensure the small end of the heat sink clip is positioned into the heat sink as far as it will go.

Note: The heat sink included with this upgrade may not resemble the heat sink on the processor in your system. Several types of heat sinks are used with the Pentium III processor.

CAUTION

When performing the next three steps, be sure the heat sink is held firmly in position. If the heat sink should slide across the top of the processor, the thermal pad may be damaged.

11. Attach the small end of the heat sink clip to the tab located on the base of the ZIF socket. See Figure 4-13, A. Gently lower the heat sink onto the processor, being careful not to move the heat sink from side to side.

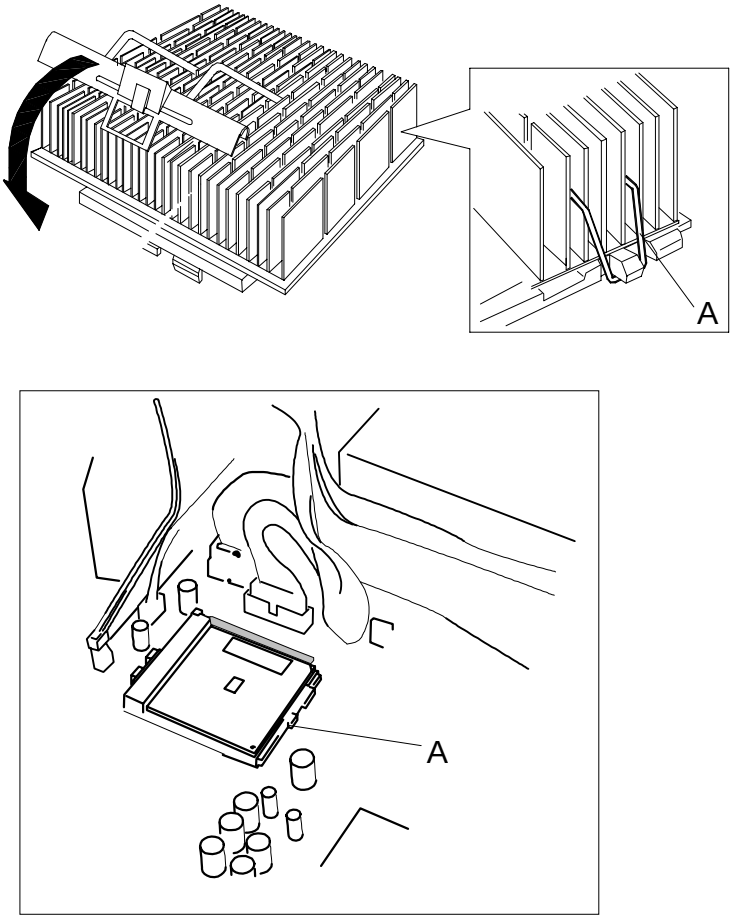


Figure 4-13. Positioning the Heat Sink Clip

12. Using a small flat blade screwdriver, press down on the heat sink clip retention latch and hook it under the fastener tab on the base of the ZIF socket, as shown in Figure 4-14, A. The heat sink clip is now secured to the fastener tab of the ZIF socket.

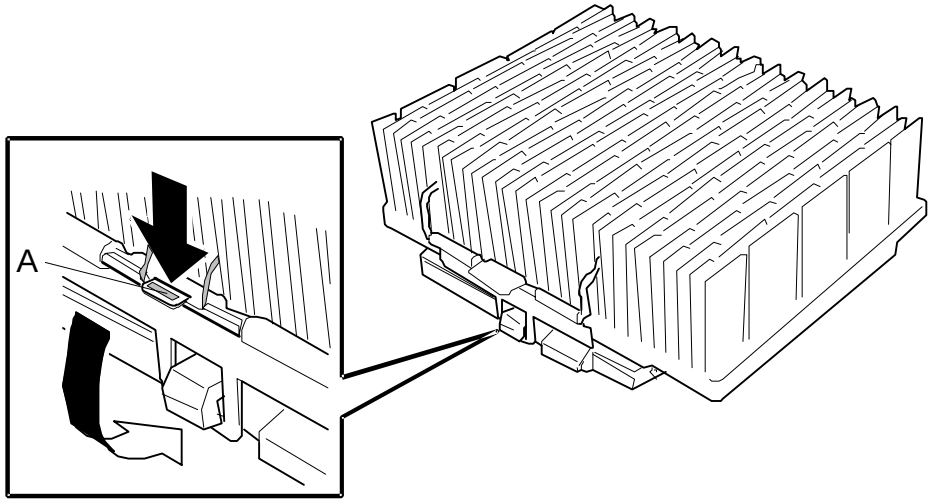


Figure 4-14. Installing Heat Sink Clip

13. If you installed a processor into the secondary socket, install a VRM board into the system board. See Figure 4-15. Position the board over the socket on the board and press down evenly on the board until it seats correctly.

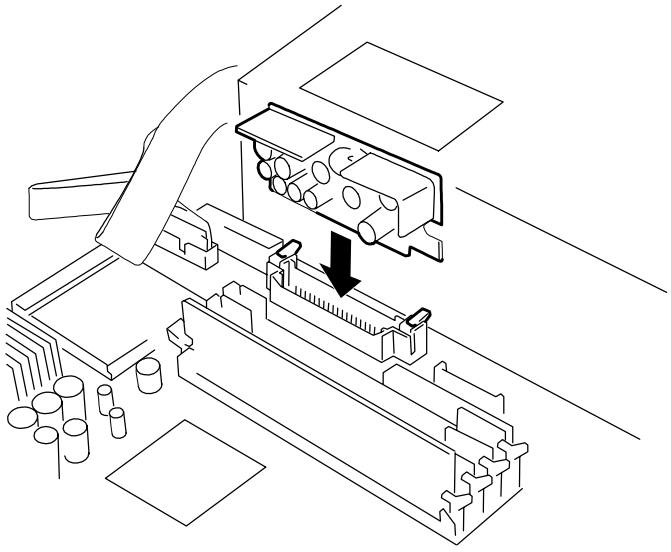


Figure 4-15. Installing the VRM Board

14. Record the processor in the equipment log.

15. Replace the air duct, left side panel and the front door as described earlier in this chapter.

16. Plug in the system power cord, and turn on the system.

DIMMs

The system board contains four DIMM sockets labeled 1 through 4 (Figure 4-16). Each socket can hold a single 72-bit DIMM module with 64MB, 128MB, 256MB, 512MB, or 1GB of memory. When all four sockets are populated, the system board supports a maximum of 4 GB of memory with 1GB DIMMs. A DIMM will always be installed in socket 1. When you install additional DIMMs, you must start with the first empty socket next to the DIMMs already installed. When you remove DIMMs, you must start with the highest number occupied DIMM socket on the system board.

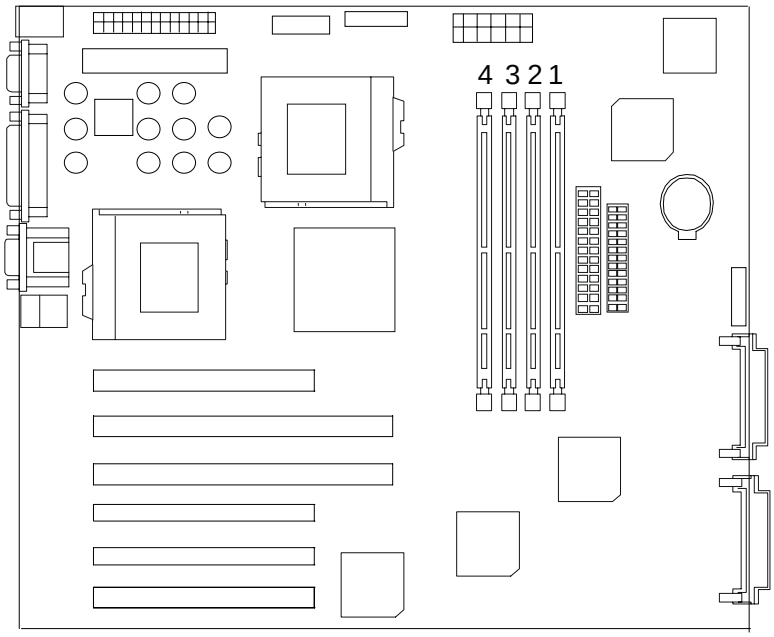


Figure 4-16. DIMM Locations

Installing DIMMs

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door and remove the air duct and left side panel as described earlier in this chapter.

> **⚠ CAUTION**
> Observe static precautions. Use an antistatic wrist strap.
> Hold DIMMs only by their edges.

3. If applicable, remove the dust cover from the DIMM socket in which you are installing the DIMM.
4. Holding the DIMM module only by the edges, remove it from its antistatic package.
5. Position the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket. See Figure 4-17.

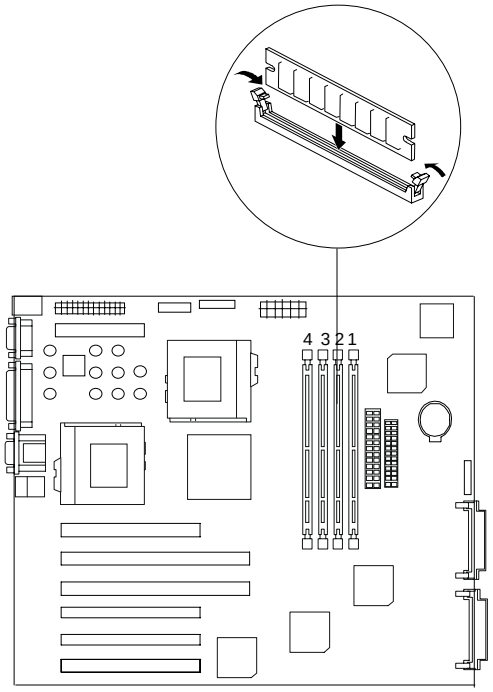


Figure 4-17. Inserting Memory DIMMs

6. Insert the bottom edge of the DIMM into the socket, and press down firmly on the DIMM until it seats correctly.
7. Gently push the plastic ejector levers on the socket ends to the upright position.
8. Repeat the steps to install each additional DIMM.

9. Replace the air duct, left side panel and the front door as described earlier in this chapter.

10. Plug in the server power cord, and power on the server.

Removing DIMMs

⚠ CAUTION

Use extreme care when removing a DIMM. Too much pressure can damage the socket slot. Apply only enough pressure on the plastic ejector levers to release the DIMM.

1. Power off the system and ensure it is disconnected from the AC power source.

2. Open and remove the front door and remove the left side panel and air duct as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap. Hold DIMMs only by their edges.

3. Gently push the plastic ejector levers out and down to eject a DIMM from its socket. See Figure 4-18.

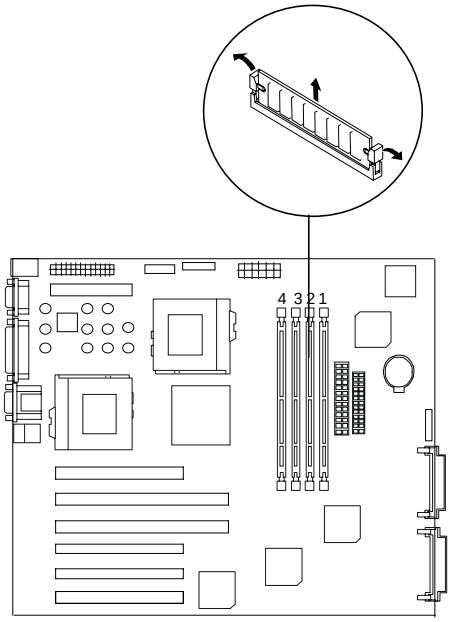


Figure 4-18. Removing Memory DIMMs

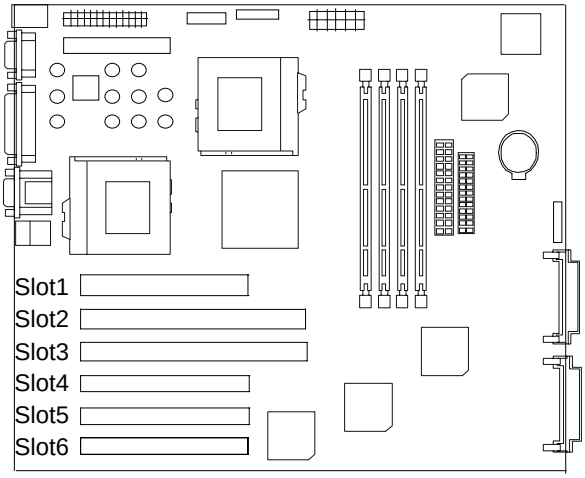
4. Hold the DIMM only by its edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket, and store it in an antistatic package.

5. Repeat the above steps to remove the remaining DIMMs.

6. If available, install a DIMM dust cover in any empty DIMM.
7. Replace the air duct, left side cover and install and close the front door.
8. Plug in the server power cord, and power on the server.

Option Boards

This section describes how to install and remove PCI option boards. The system board includes six PCI bus expansion slots. See Figure 4-19.



Slot1	32 Bit/33 MHz/5V PCI Connector Slot
Slot2	64 Bit/66 MHz/5V PCI Connector Slot
Slot3	64 Bit/66 MHz/5V PCI Connector Slot
Slot4	32 Bit/33 MHz/5V PCI Connector Slot
Slot5	32 Bit/33 MHz/5V PCI Connector Slot
Slot6	32 Bit/33 MHz/5V PCI Connector Slot

Figure 4-19. PCI Slot Locations

Recommended PCI Option Board Locations

Table 4-1. PCI Option Board locations

Option Board	Recommended PCI Slot Location (See Figure 4-20)
1st Intel Pro100+ LAN Board	Slot 1
2nd Intel Pro100+ LAN Board	Slot 5
3rd Intel Pro100+ LAN Card	Slot 6
SecuRAID 110 Controller	Slot 4

Installing an Option Board

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door and remove the left side panel as described earlier in this chapter.
3. Remove and save the expansion slot screw and cover. See Figure 4-20.

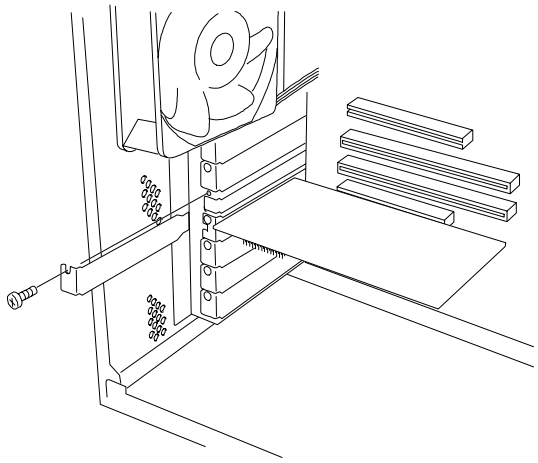


Figure 4-20. Removing the Expansion Slot Screw and Cover

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Remove the option board from its protective wrapper, holding the board only by the edges. Do not touch the board components or the gold connectors.
5. Record the option board serial number in the equipment log.
6. Set any board jumpers or switches as described in the documentation that comes with the option board.
7. Holding the board by its top edge or upper corners, firmly press the board into an expansion slot on the system board. The tapered foot of the option board retaining bracket must fit into the mating slot in the expansion slot. See Figure 4-21.

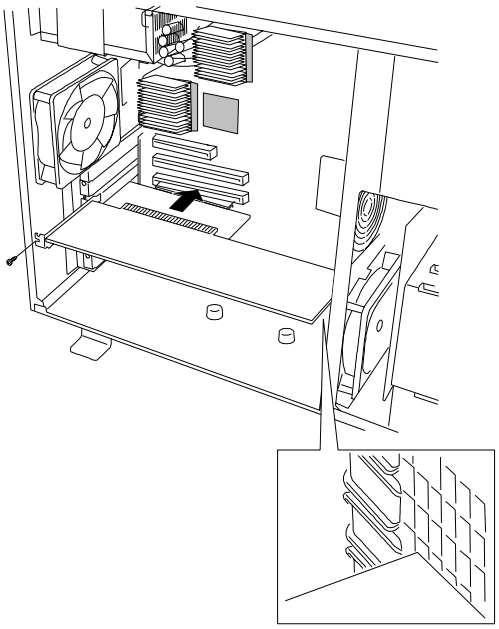


Figure 4-21. Installing an Option Board

8. Align the rounded notch in the retaining bracket with the threaded hole in the expansion slot frame. The retaining bracket fits into the space that was occupied by the expansion slot cover.
9. Reinstall the screw in the threaded hole. Be sure to push the bracket slot up against the screw before you tighten it. If this is not done, the bracket may interfere with an adjacent bracket.
10. Connect any external cables (if they are needed) to the installed option board.
11. Replace the left side panel and the front door following procedures described earlier in this chapter.
12. Plug in the system power cord, and power on the system.

Removing an Option Board

> ***Note:*** Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emissions characteristics of the system and to assure proper cooling of the system components.

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door and remove the left side panel as described earlier in this chapter.
3. Disconnect any cables attached to the option board you are removing.
4. Remove and save the option board retaining bracket screw.

5. Hold the board at each end and carefully rock it back and forth until the edge connectors pull free. Make sure that you do not scrape the board against other components.
6. Remove the board from the expansion slot and place it in an antistatic wrapper. If you are replacing a board, go to "Installing an Option Board" earlier in this chapter, otherwise continue.
7. Install an expansion slot cover over the vacant slot using the previously removed screw.
8. Replace the left side panel and the front door as described earlier in this chapter.
9. Plug in the system power cord, and power on the system.

Installing a RAID Controller Board

Use this procedure to install a RAID controller board.

1. Install the RAID controller board into PCI slot 4 on the system board. See "Installing an Option Board" earlier in this chapter.
2. Cable the RAID controller board as described below (see "System Cabling" in Appendix A):
   - Remove the end of the SCSI interface cable that is plugged into the wide SCSI connector on the system board.
   - Reinstall the end of the SCSI interface cable just removed into the Channel 0 connector on the RAID board.

Hard Disk Drives

Your system supports a variety of SCSI hard disk drives installed in the system's hard disk drive bay. Contact your sales representative or dealer for a list of approved devices. Refer to Figure 4-22.

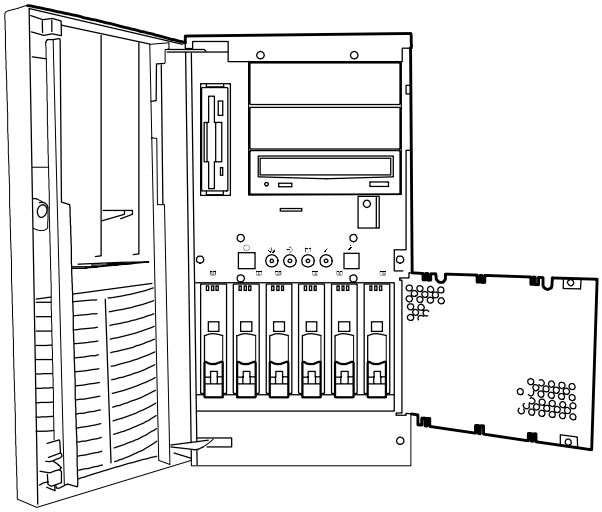


Figure 4-22. SCSI Disk Drive Bays

If you are adding or removing a SCSI hard disk device, consider the following:

⚠ CAUTION

Do not hot swap a non-LVD-disk-drive into a LVD-disk-drive only system for it may cause data corruption. The only way a non-LVD-disk-drive can be used with an all LVD-disk-drive system is by first powering down the system, installing the non-LVD-disk-drive, and then powering the system back up.

Note: Installing a non-LVD-disk-drive into an all LVD-disk-drive system causes all the drives to operate in the non-LVD mode

Installing or Swapping a Hard Disk Drive in a Hot-Swap Bay

This procedure describes installing a new hard disk drive or swapping out a faulty drive from one of the six hot-swap SCSI disk drive bays. The SCSI drives must use the industry standard 80-pin Single Connector Attachment (SCA) connector. Each drive must be installed in a drive carrier.

> **Note:** To order a disk with a carrier, contact your sales representative or dealer.

- If installing new drives, follow an installation scheme starting with the left-most drive. Fill the bays left-to-right (1 through 6). See Figure 4-23.

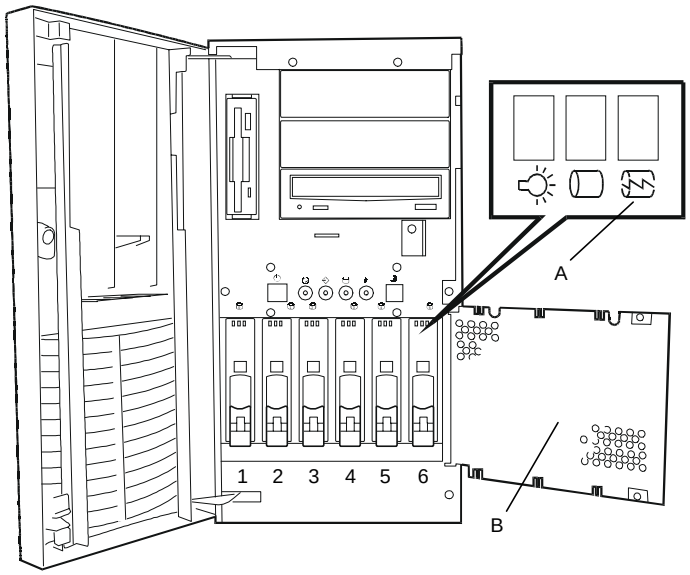


Figure 4-23. SCSI Disk Drive Installation Scheme

- The hard disk SCSI address assignment is:

Bay	Device	SCSI ID Address
1	First Hard Disk (Left)	0
2	Second Hard Disk	1
3	Third Hard Disk	2
4	Fourth Hard Disk	3
5	Fifth Hard Disk	4
6	Sixth Hard Disk (Right)	5

- If an individual SCSI drive fault LED (yellow light) is on steadily, this indicates that the drive has been flagged as faulty by the RAID host controller (See Figure 4-23,A). Follow the procedure described in this section to remove the faulty drive and swap in a good one.

Note: ESD can damage disk drives, boards, and other parts. This system can withstand normal levels of environmental ESD while you are hot-swapping SCSI hard drives. However, we recommend that you do all procedures in this chapter only at an ESD workstation or provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

CAUTION

Drive manufacturer's caution against moving a disk drive that is still spinning because of possible damage to the drive.

After you determine which drive has been flagged as faulty, the procedure is the same to swap a drive or to install one for the first time.

Installing or Swapping a Hard Disk Drive

1. Open the front door as described earlier in this chapter.
2. Open the EMI metal panel in front of the hard drive cage by turning its two thumb lock screws counter clockwise (see Figure 4-23, B).
3. If swapping a hard disk drive, remove the drive and its carrier from the SCSI hard disk drive bay by performing the following procedures:

CAUTION

Depending on the drive fault, the drive may be still spinning when you remove it. Follow the next steps exactly when removing drives.

- Pull the disk carrier locking tab downward (see Figure 4-24).
- Grasp the disk carrier handle and pull the faulty disk drive out of the bay far enough to disengage the drive connector from the backplane. Wait 30 seconds until the drive spins down.
- Remove the carrier from of the drive bay.

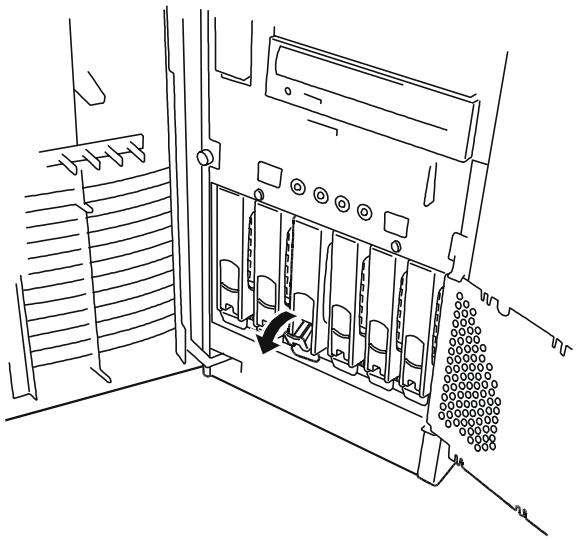


Figure 4-24. Removing a Hard Disk Drive and Carrier

4. Place the drive carrier on an antistatic surface with the four mounting screws facing up.
5. Remove the hard disk drive from the disk carrier. See Figure 4-25.

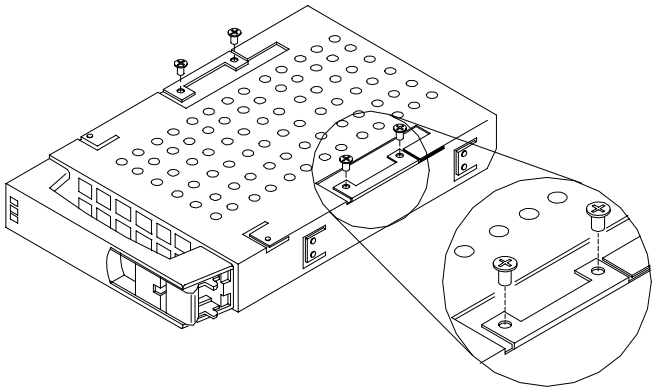


Figure 4-25. Removing/Installing a Hard Disk Drive to the Carrier

6. Remove the new drive from its protective wrapper, and place on an antistatic surface.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

7. Record the drive model and serial numbers in the equipment log.
8. Install the replacement drive onto the drive carrier.
   - Place the drive on the carrier, with its connector facing the rear of the carrier.
   - Turn the drive and carrier over and secure the drive in the carrier with the four screws supplied with the disk drive. See Figure 4-25.

9. Install the drive carrier with drive into the bay as follows:

- Open the disk carrier-locking tab.
- Align the drive carrier with the bay guide rails.
- Slide the drive carrier into the bay until it docks with the SCSI backplane connector. See Figure 4-26.
- Close the disk carrier locking tab ensuring it is secured as shown in Figure 4-27.

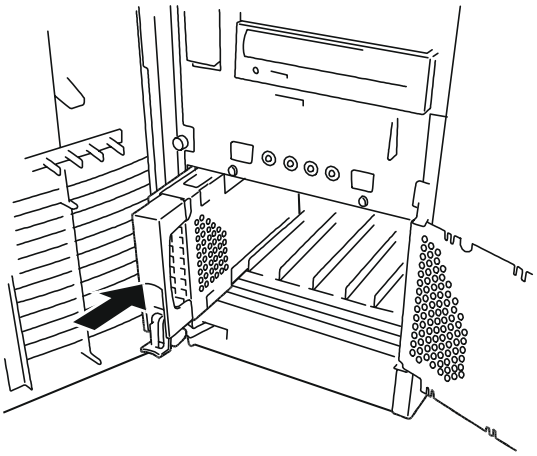


Figure 4-26. Installing a Disk Carrier into the Disk Bay

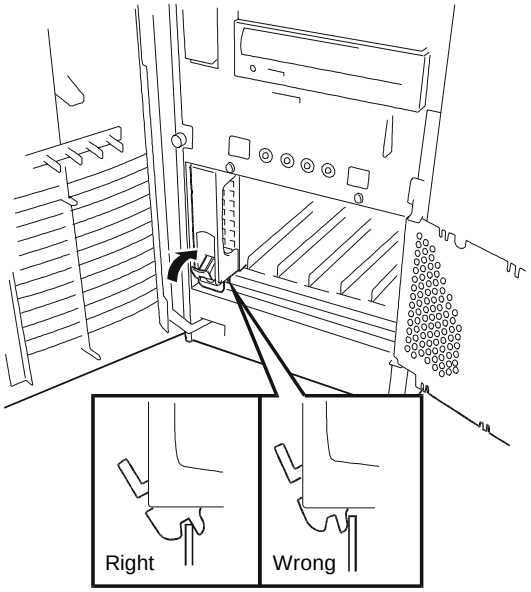


Figure 4-27. Locking the Disk Carrier

10. Close and secure the EMI metal panel.

11. Close the front door on the system. If necessary, configure the system as described in Chapter 3 "Configuring Your System".

Removable Media Devices

A variety of SCSI removable media devices can be installed in peripheral bays A and B (Figure 4-28). An IDE CD-ROM is always mounted in bay C and a 3.5-inch diskette drive is always mounted in bay D. Other devices should be installed in the first available bay from the top (bay A). Contact your sales representative or dealer for a list of approved devices.

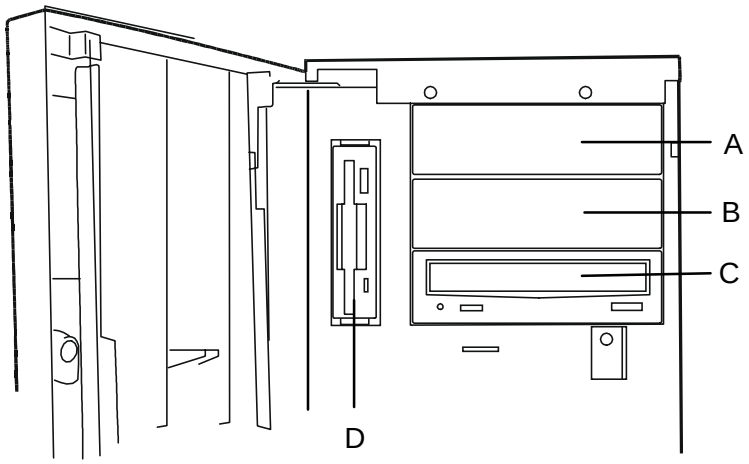


Figure 4-28. Removable Media Devices

If you are adding or removing a SCSI removable media device, consider the following:

- The optional SCSI tape drive address assignment is 2.
- SCSI termination must be enabled on the last SCSI drive of the daisy chain cabling. If the SCSI tape drive is your only SCSI device on the SCSI controller B, termination must be enabled in the tape drive.

Removing the 3.5-Inch Diskette Drive Mounting Assembly

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door as described earlier in this chapter.
3. Remove the left side panel as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Disconnect the power and interface cable from the rear of the diskette drive.
5. Remove the screw securing the diskette drive mounting bracket to the to the front panel. See Figure 4-29.

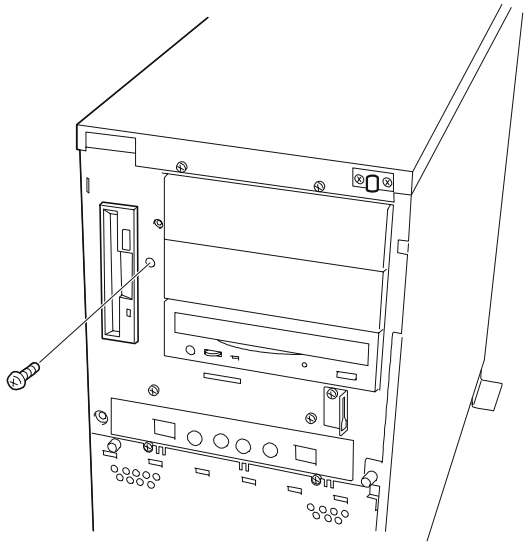


Figure 4-29. Removing the Diskette Assembly Mounting Screw

6. Slide the diskette assembly to the rear of the system to release the bracket from the removable media drive cage. See Figure 4-30.

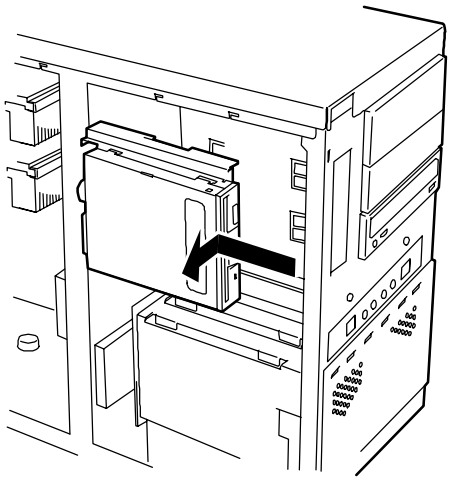


Figure 4-30. Removing the Diskette Assembly

7. Remove the diskette and mounting bracket from the system and place the assembly on an antistatic surface.

8. If you are replacing the diskette drive, remove the four screws securing the diskette drive to the mounting bracket.

9. Reverse Steps 1 through 8 to install a replacement diskette drive.

Installing a 5.25-Inch Media Device

⚠ CAUTION

CD-ROM devices contain a laser system and are classified as CLASS 1 LASER PRODUCTS. To use these devices, thoroughly read the documentation provided by the CD-ROM manufacturer, and keep the documentation for future reference. In case of any trouble with a CD-ROM, please contact your nearest service representative. To prevent direct exposure to the laser beam, do not try to open the enclosure. Use of controls or adjustments or performance of procedures other than those specified in the CD-ROM manufacturer's documentation may result in hazardous radiation exposure

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door as described earlier in this chapter.
3. Remove the left side panel as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Perform Steps 4, 5, and 6 of *Removing the 3.5-Inch Diskette Drive* described earlier in this chapter. It is not necessary to remove the diskette drive from the mounting bracket to which it is mounted.
5. Remove the filler panel from the system bay location you are installing a media device. The filler panel is released by removing one screw located on the front right side of the filler panel (Figure 4-31, A) and another screw located inside the system on the left side of the filler panel (Figure 4-31, B).

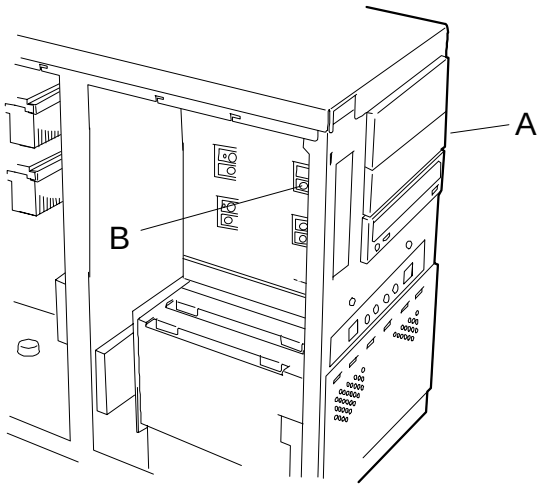


Figure 4-31. Removing the Filler Panel

6. Remove the screw securing the filler panel removed in the previous step to the right device rail. Save the right device rail. See Figure 4-32.

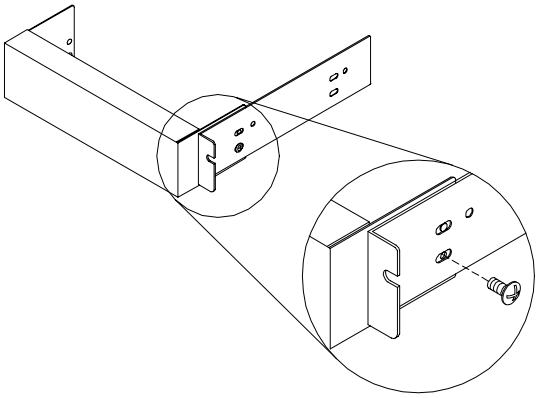


Figure 4-32. Removing the slide rail from the Filler Panel

7. Remove the device from its protective wrapper and place it on an antistatic surface. Record the drive model and serial number in the equipment log.

8. Set any drive jumpers or switches before you install the drive. See the documentation that comes with the device for jumper or switch information.

> ***Note:*** If the drive comes with drive rails, do not use them. Remove any rails already attached.

9. Position the right device rail along the right side of the device so that the four holes in the device rail match the four holes located in the side of the device. Attach the right device rail to the device with four screws as shown in Figure 4-33.

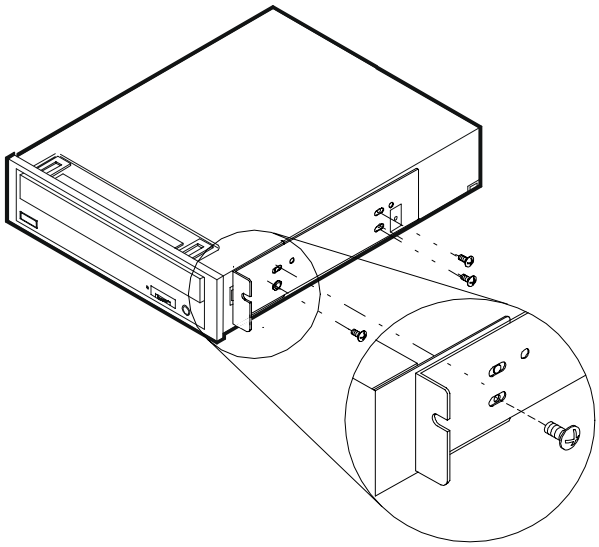


Figure 4-33. Attaching the Right Side Rail

10. Install the media device into the bay as follows:

- Move any cables in the bay out of the way.
- Align the rails on the media device with the supports in the bay.

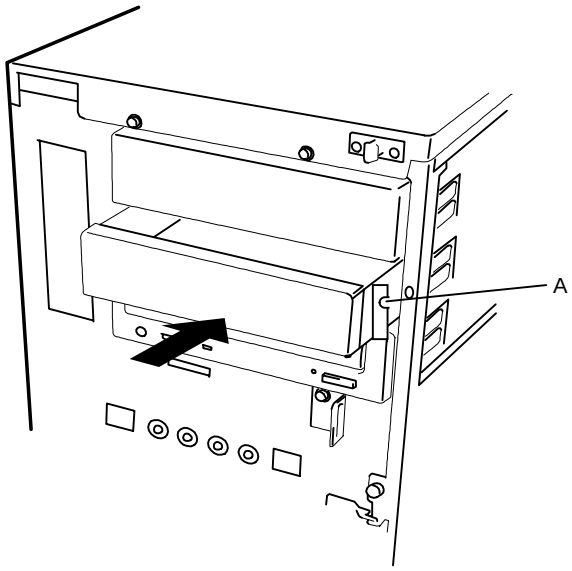


Figure 4-34. Installing a Removable Media Device

- Slide the device into the bay until the right slide rail is against the system cabinet. See Figure 4-34, A.

11. Secure the right side of the device to the system with the screw previously removed in Step 5. See Figure 4-34, A.

12. Secure the left side of the device to the device bay with two screws previously removed in Step 5. See Figure 4-35, A.

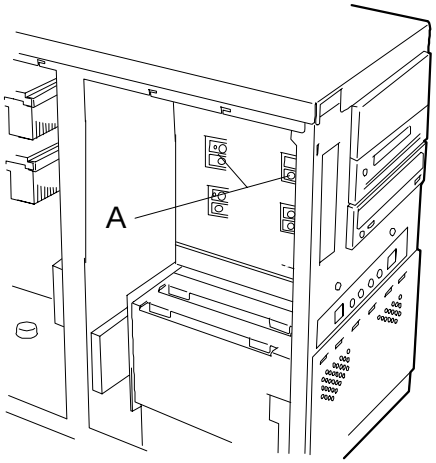


Figure 4-35. Securing a Removable Media Device

13. Connect the interface and power cable to the device.

14. Replace the left side panel and the front panel.

15. Plug in the system power cord, and power on the system.

Removing a 5.25-Inch Device

⚠ CAUTION

CD-ROM devices contain a laser system and are classified as CLASS 1 LASER PRODUCTS. To use these devices, thoroughly read the documentation provided by the CD-ROM manufacturer, and keep the documentation for future reference. In case of any trouble with a CD-ROM, please contact your nearest service representative. To prevent direct exposure to the laser beam, do not try to open the enclosure. Use of controls or adjustments or performance of procedures other than those specified in the CD-ROM manufacturer's documentation may result in hazardous radiation exposure

1. Power off the system and ensure it is disconnected from the AC power source.
2. Open and remove the front door as described earlier in this chapter.
3. Remove the left side panel as described earlier in this chapter.

⚠ CAUTION

Observe static precautions. Use an antistatic wrist strap.

4. Perform Steps 4, 5, and 6 of *Removing the 3.5-Inch Diskette Drive* described earlier in this chapter. It is not necessary to remove the diskette drive from the mounting bracket to which it is mounted.
5. Disconnect the interface cable and voltage cable from the rear of the device you are removing.
6. Remove the screws securing the device to the left side of the removable media device bay. See Figure 4-36, A, B.

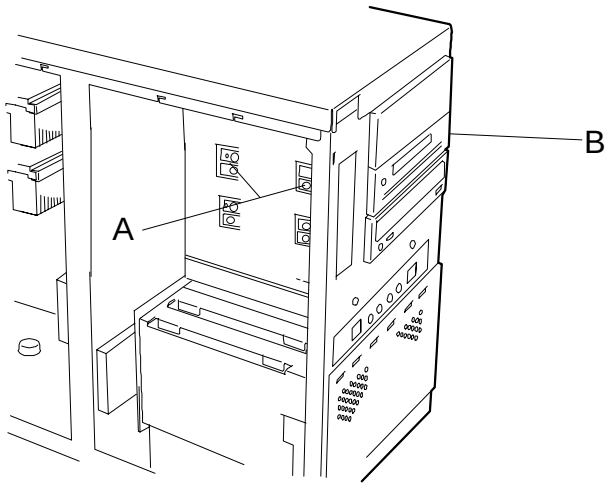


Figure 4-36. Removing a Removable Media Device

7. Slide the removable media device out of the device bay and set it down on an antistatic surface.

8. Remove the screws securing the right side rail to the device. See Figure 4-33.

9. To install a replacement device, follow the procedures in *Installing a 5.25-Inch Media* Device described earlier in this chapter.

Power Supply

> **Note:** This section applies to server models that include the 350 watt modular power supplies. If your server includes the standard integrated 300 watt power supply, it contains no user serviceable parts and should only be replaced by qualified service personnel.

Your system may contain one or two power supplies. The second power supply is optional and provides a redundant configuration that ensures continued operation of the system in the unlikely event one of the power supplies fails.

This section provides procedures for installing a second power supply as well as removing a faulty power supply.

Installing the Optional Power Supply

To install the optional power supply:

1. Power down the system and remove the power cord from the ac power outlet.
2. At the rear panel loosen the screw (A) on the blank panel covering the slot for the optional power supply. Remove the blank panel. See Figure 4-37.

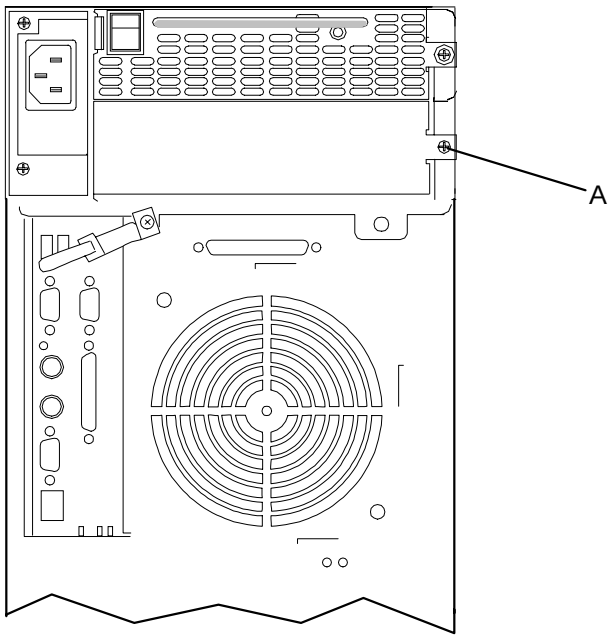


Figure 4-37. Removing the Power Supply Blank Panel

3. Referring to Figure 4-38, slide the optional power supply into the chassis and tighten the thumbscrew (A) that secures the power supply in the chassis.

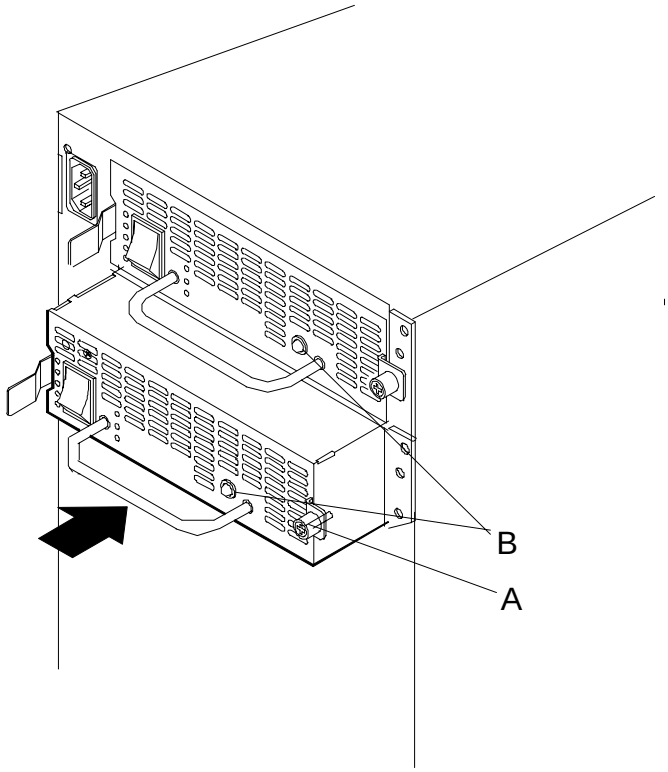


Figure 4-38. Installing the Optional Power Supply

4. Connect the power cord to the input receptacle on the rear of the power supply chassis and to the AC outlet.

5. Turn on the power supplies and observe the green LEDs on each power supply is lit indicating the supply is operational.

Replacing a Power Supply

When a power supply unit fails, the green LED on the failed power supply is extinguished. See Figure 4-38, B for the location of the power supply LEDs.

⚠ CAUTION

If the optional power supply is not installed, power down the system when replacing the power supply; if the optional power supply is installed, a faulty power supply may be removed without powering down the system.

1. Power down the system if only one power supply is installed.

2. Disconnect the AC cable from the power supply chassis.

3. At the rear panel loosen the thumbscrew (A) on the failed power supply. Open the door. See Figure 4-39.

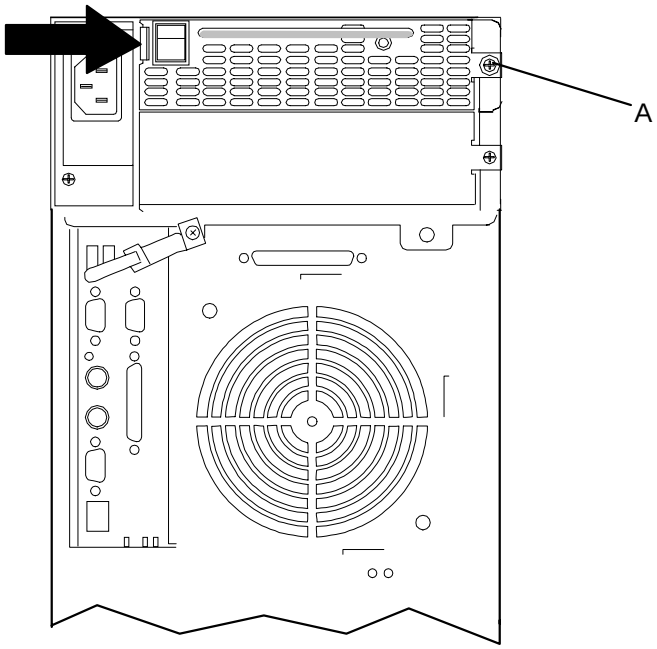


Figure 4-39. Installing the Optional Power Supply

4. Push in on the drive rail clip located on the left side of the supply, grip the power supply handle and pull the power supply out from the rear of the chassis. See Figure 4-39.

5. Referring to Figure 4-38, slide the power supply into the chassis and tighten the thumbscrew (A) that secures the power supply in the chassis.

6. Connect the power cord to the input receptacle on the rear of the new power supply chassis and to the AC outlet.

7. Turn on the power supply and observe the green LED on the installed power supply is lit indicating the replacement power supply is operational.

5

Problem Solving

- Problem Solving
- Static Precautions
- Troubleshooting Checklists
- Diagnostic Testing
- Specific Problems and Corrective Actions
- Problems with the Network
- Plug and Play Installation Tips
- BIOS User’s Information
- How to Identify BIOS and BMC Revision Levels
- How to Identify System Event Log Data

Problem Solving

This chapter helps you identify and solve problems that may occur during system installation or while using your system. The first section of this chapter tells you how to reset your system in the event of problems. The next few sections provide troubleshooting checklists and procedural steps that help you isolate specific system problems. The last section includes BIOS, system, and disk status user information.

⚠ WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cord is connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage

⚠ CAUTION

Operating your system with the side panels removed can damage your system components. For proper cooling and airflow, always replace the side panels before powering on your system.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Troubleshooting Checklists

The following subsections provide troubleshooting checklists for problems that occur at initial system startup, when you run new application software, and after the system hardware and software have been running correctly.

Initial System Startup

Incorrect installation or configuration usually causes problems that occur at initial system startup. Hardware failure is a less frequent cause. If you have problems during initial system startup, check the following:

- Are the system power cords properly connected to the system and plugged into a NEMA 5-15R outlet (100-120 Vac) or a NEMA 6-15R outlet (200-240 Vac)?
- Is AC power available at the wall outlet?
- Is the power on/off push-button switch on the front panel in the ON position (power on LED should be lit)?
- Are all cables correctly connected and secured?
- Are all the PCI/ISA option boards fully seated in their connector slots on the system board?
- Are all jumpers and switch settings on option boards and peripheral devices correct? If applicable, ensure that there are no conflicts; for example, two option boards sharing the same interrupt.
- Are the processors fully seated in their slots on the system board? Refer to Chapter 4 for installation instructions?
- Are all DIMMs fully seated and installed correctly? Refer to Chapter 4 for installation instructions?
- Are all option boards and disk drives installed correctly? Refer to the Chapter 4.
- Is the system hard disk drive properly formatted or defined?
- Is the operating system properly loaded? Refer to the operating system documentation.
- Are all drivers properly installed? For information about installing drivers, refer to your Network Operating System Configuration Guide.
- Are the configuration settings in BIOS Setup and the Adaptec SCSI Utility correct? For information about running these utilities, refer to the “Configuring Your System” chapter.

If the above items are all correct, but the problem reoccurs, refer to “Additional Troubleshooting Procedures” in this chapter.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. If you have problems while running new application software, check the following:

- Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
- Is the software an authorized copy? Unauthorized copies often do not work. Obtain an authorized copy of the software.
- If you are running the software from a diskette, is it a good copy?
- If you are running the software from a hard disk drive, is the software correctly installed? Where all necessary procedures followed and files installed?
- If you are running the software from a CD-ROM disk is the disk scratched or dirty?
- Are the correct device drivers installed?
- Is the software correctly configured for the system?
- Are you using the software correctly?
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problems persist with the software, contact the software vendor's customer service representative.

After System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. However, many situations that are easy to correct can also cause such problems. If you have problems after the system has been running correctly, check the following:

- If you are running the software from a diskette or CD-ROM, try a new copy of the software.
- If you are running the software from a hard disk drive, try running it from a floppy. If the software runs correctly, there may be a problem with the copy on the hard disk. Reinstall the software on the hard disk drive and try running it again. Make sure all the necessary files are installed.
- If the problem recurs, you may need to reformat the hard disk drive. The hard disk drive, the drive controller, or the system board may be defective.
- If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.

> ***Note:*** Voltage spikes can corrupt or destroy data files on the drive. If you are experiencing voltage spikes on the power line, install a surge suppresser between the power outlet and the system power cord.

If the problem recurs after you have checked and corrected all of the above items, refer to “Diagnostic Testing” in this chapter.

Diagnostic Testing

This section provides a more detailed approach to diagnostic testing and identification of a problem and locating its source.

Error Checking

Each time you turn on the system, POST (Power-On-Self-Test) runs automatically and checks the system boards, processors, memory, keyboard, and most installed peripheral devices.

If POST finds an error, it displays an error message. Refer to the *Error Message* section in this chapter for an explanation of each error message.

Troubleshooting Guide

Use the following troubleshooting procedures to help you identify a problem. These general procedures lead you through the following:

- Preparing the system for diagnostic testing
- Monitoring POST while it is running
- Verifying proper operation of key system LEDs
- Confirming loading of the operating system.

Preparing the System for Diagnostic Testing

To prepare the system for diagnostic testing, perform the following:

> ***Note:*** Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

1. Turn off the system and all external peripheral devices. Disconnect all devices from the system except the keyboard and video monitor.
2. Make sure the system power cord is plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two-thirds of their maximum ranges (refer to the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn on the system. If the power indicator LED does not light, refer to “Power Light Does Not Light” found later in this chapter.

Monitoring POST

Each time you turn on the system, the Power-On Self-Test (POST) runs automatically and checks the system board, processor board, memory, keyboard, and most installed peripheral devices.

During the memory test, POST displays the amount of memory that it is able to access and test. Depending on the amount of memory, it may take several minutes to complete the memory test.

Press **F2** to enter SETUP. If you do not press **F2**, the above message remains for a few seconds and the boot process continues.

If POST finds an error, it displays an error message and, in case there is a problem with the display, it emits a series of long and short beeps. Write down any beep code emitted. This information is useful to your service representative.

Refer to the "BIOS User's Information" section in this chapter for a list of items to check for each error code and for an explanation of the error beep codes.

The POST Tests table at the end of this chapter lists keys active during POST and provides a description of errors that may occur.

The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

Report any error code to your service representative.

POST Keys and Errors

Action/Message	Description
If POST Beeps Before Video Appears	Initialization failed before video initialized. Most beep code errors are fatal; initialization cannot continue. Refer to the section “BIOS User’s Information” in this chapter.
If Monitor Displays Error	Note error; press **F1** to continue boot or **F2** to enter Setup. Refer to the section “BIOS User’s Information” in this chapter.
To Enter Setup	Setup changes specific options, then writes to CMOS, NVRAM. Press **F2** during initialization to run Setup. If you do not press **F2**, the boot process continues.
Enter BOOT Diskette	If prompted, insert the boot diskette.

Verifying Proper Operation of Key System Indicators

As POST determines the system configuration, it tests for the presence of each mass storage device installed in the system. As each device is checked, its activity indicator should turn on briefly. Check for the following:

- Does the diskette drive activity indicator turn on briefly? If not, refer to “Diskette Drive Activity Indicator Does Not Light” in this chapter.
- If there is a hard disk drive or SCSI devices installed in the system, does the hard disk drive activity indicator turn on briefly? If not, refer to “Hard Disk Drive Activity Indicator Does Not Light” in this chapter.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, refer to “Problems with Application Software” found later in this chapter.

Specific Problems and Corrective Actions

This section provides possible solutions for the following specific problems:

- Power LED does not light
- No beep or incorrect beep pattern
- No characters appear on screen
- Characters on the screen appear distorted or incorrect
- System cooling fan does not rotate
- Diskette drive activity LED does not light
- Hard disk drive activity LED does not light
- CD-ROM drive activity LED does not light
- Problems with application software
- The startup prompt “Press <F2> key if you want to run Setup” does not appear on the screen.
- The bootable CD-ROM is not detected.

Try the solutions in the order given. If you cannot correct the problem, contact your service representative for assistance.

Power LED Does Not Light

Check the following:

- Is the system operating normally? If so, the power LED is probably defective.
- Are there other problems with the system? If so, check the items listed under System Cooling Fans Do Not Rotate.

Incorrect or No Beep Code

Check the following:

- Is the speaker cable connected to the system board?

If the system operates normally, but there was no beep, the speaker may be defective, contact your service representative for assistance.

Record the beep code emitted by POST, and see the “Messages and Beep Codes” section found later in this chapter.

No Characters Appear on Screen

Check the following:

- Is the keyboard working? Check to see if the **Num Lock** light is functioning.
- Is the video display monitor plugged in and turned on?
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Is the video monitor signal cable properly installed?
- Is the onboard video controller enabled?

If you are using a video controller board, verify that the video controller board is fully seated in the system board connector.

If there are still no characters on the screen after you reboot the system, contact your service representative or authorized dealer for assistance.

POST emits one long beep and two short beeps pattern to indicate a possible problem with the video display controller. If you do not receive a beep pattern and characters do not display, the video display or video controller may have failed. Contact your service representative or authorized dealer for assistance.

Characters are Distorted or Incorrect

Check the following:

- Are the brightness and contrast controls properly adjusted on the video display? Refer to the documentation supplied with your video display.
- Are the video monitor's signal and power cables properly installed?
- If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative for assistance.

System Cooling Fans Do Not Rotate

Check the following:

- Is AC power available at the wall outlet?
- Are the system power cords properly connected to the power supplies and the AC wall outlets?
- Are the power connectors for the cooling fans connected? See the "Monitor Matrix" table in Appendix C.
- Is the front panel power on indicator lit?

If the switches and connections are correct and the power outlet is functioning, the power supply has probably failed. Contact your service representative for assistance.

Diskette Drive Activity LED Does Not Light

Check the following:

- Are the diskette drive's power and signal cables properly installed?
- Is the diskette drive properly configured?
- Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.

If you are using the onboard diskette drive controller, use BIOS Setup to make sure that the diskette drive controller is set to Enabled. For information about running BIOS Setup, refer to the “Configuring Your System” chapter.

If the problem persists, there may be a problem with the diskette drive, system board, or drive signal cable. Contact your service representative for assistance.

CD-ROM Drive Activity Light Does Not Light

Check the following:

- Is the power and signal cable to the CD-ROM drive properly installed?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?
- Is the onboard IDE controller enabled?

Problems with Application Software

If you have problems with application software, perform the following:

- Verify that the software is properly configured for the system. Refer to the software installation and operation documentation for instructions on setting up and using the software.
- Verify a different copy of the software to see if the problem is with the copy that you are using.
- Make sure all cables are installed correctly.
- Verify that the system board jumpers are set correctly. Refer to the "Configuring Your System" chapter for jumper settings.
- If other software runs correctly on the system, contact your vendor about the failing software.

If the problem persists, contact the software vendor's customer service representative for assistance.

Bootable CD-ROM Is Not Detected

Check the following:

- Is the BIOS set to allow the CD-ROM to be the first bootable device? Check your BIOS Setup (F2) configuration.

Problems with the Network

Diagnostics pass, but the connection fails:

- Make sure the network cable is securely attached.

The controller stopped working when an add-in adapter was installed:

- Make sure the cable is connected to the port from the onboard network controller.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts; OS/2 does not.
- Try reseating the add-in adapter.

The add-in adapter stopped working without apparent cause.

- Try reseating the adapter first; then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Run the diagnostics.

Plug and Play Installation Tips

Some common PCI tips are listed here.

- Reserve interrupts (IRQs) and/or memory addresses specifically for an ISA adapter. This prevents PCI cards from trying to use the same settings an ISA card is using. Use the BIOS Setup Utility to keep track of ISA adapter resources.
- Certain drivers may require interrupts that are not shared with other PCI drivers. The BIOS Setup Utility can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it may be necessary to alter settings so that interrupts are not shared.

BIOS User's Information

This section describes the various screen messages and beep codes of the system BIOS. The BIOS indicates errors by writing an error code to the PS/2-standard logging area in the Extended BIOS Data Area, and by displaying a message on the screen, which is sometimes preceded by the POST Error Code. The error code will also be logged to the Event Logging area.

Note: Your system error log will be lost, if your system ac power source is off or disconnected.

POST Error Codes and Messages

Whenever a recoverable error occurs during POST, BIOS displays a message on the video display screen and causes the speaker to beep as the message appears. BIOS also issues a beep code (one long tone followed by two short tones) during POST if the video configuration fails or if an external ROM module does not a checksum of zero. The “POST Error Codes and Messages” table is a list of the error codes and messages written at the start of each POST test. The “POST Error Beep Codes” table is a list of beep codes issued for each POST test.

Table 5-1. POST Error Codes and Messages

Code	Error Message
0200	Failure Fixed Disk
0210	Stuck Key
0211	Keyboard error
0212	Keyboard Controller Failed
0213	Keyboard locked - Unlock key switch
0220	Monitor type does not match CMOS - Run SETUP
0230	System RAM Failed at offset
0231	Shadow RAM Failed at offset
0232	Extended RAM Failed at address line
0233	Memory type mixing detected
0234	Single-bit ECC error
0235	Multiple-bit ECC error occurred
0250	System battery is dead - Replace and run SETUP
0251	System CMOS checksum bad - Default configuration used
0260	System timer error
0270	Real time clock error
0271	Check date and time
02B0	Diskette drive A error
02B2	Incorrect Drive A type - run SETUP
02D0	System cache error - Cache disabled
0B1B	PCI System Error on Bus/Device/Function
0B1C	PCI Parity Error on Bus/Device/Function
0B30	CPU 1 Fan Alarm occurred
0B31	CPU 2 Fan Alarm occurred
0B32	Chassis Fan Alarm occurred

Table 5-1. Post Error Codes and messages (Continued)

Code	Error Message
0B33	Power Unit Fan 1 Alarm occurred
0B34	Power Unit Fan 2 Alarm occurred
0B46	ESMINT not configured
0B50	CPU #1 with error taken off line
0B51	CPU #2 with error taken off line
0B5F	Forced to use CPU with error
0B60	DIMM group #1 has been disabled
0B61	DIMM group #2 has been disabled
0B62	DIMM group #3 has been disabled
0B63	DIMM group #4 has been disabled
0B6F	DIMM group with error is enabled
0B70	The error occurred during temperature sensor reading
0B71	System Temperature out of range
0B74	The error occurred during voltage sensor reading
0B75	System Voltage out of range
0B7C	The error occurred during fan sensor reading
0B80	BMC Memory Test Failed
0B81	BMC Firmware Code Area CRC check failed
0B82	BMC core hardware failure
0B83	BMC IBF or OBF check failed
0B90	BMC Platform Information Area Corrupted
0B91	BMC update firmware corrupted
0B92	Internal Use Area of BMC FRU corrupted
0B93	BMC SDR Repository empty
0B94	IPMB signal lines do not respond
0B95	BMC FRU device failure
0B96	BMC SDR Repository failure
0B97	BMC SEL device failure
0BB0	SMBIOS - SROM data read error
0BB1	SMBIOS - SROM data checksum bad
0BD0	1st SMBus device address not acknowledged
0BD1	1st SMBus device Error detected
0BD2	1st SMBus timeout

Table 5-1. Post Error Codes and messages (Continued

Code	Error Message
0C00	RomPilot reports error number xx
None	Expansion ROM not initialized
None	Invalid System Configuration Data
None	System Configuration Data Read error
None	Resource Conflict
None	System Configuration Data Write Source
None	NOTICE: Your System Redundant Power Supply is not configured
None	WARNING:IRQ not configured

Table 5-2. Post Error Beep Codes

Beeps	Error	Cause	Recommended Action
1-2-2-3	ROM Checksum Error	—	Change system board
1-3-1-1	DRAM Refresh Test Error	—	Change memory DIMM's
1-3-1-3	Keyboard Controller Test Error	—	Change system board
1-3-3-1	Memory Not Detected	No memory.	Verify DIMM installation.
		Can not write to memory	Change memory DIMM's
	Memory Capacity Check Error	No memory.	Verify DIMM installation.
		Can not write to memory	Change memory DIMM's
1-3-4-1	DRAM Address Test Error	Memory address signal failure	Change DIMM or M/B
1-3-4-3	DRAM Test low byte Error	Memory data signal failure (low)	Change DIMM or M/B
1-4-1-1	DRAM Test high byte Error	Memory data signal failure (high)	Change DIMM or M/B
1-4-3-3	All Memory Group Errors	—	—
2-1-2-3	BIOS ROM Copy-Write Test Error	Error with Shadow RAM	Change system board
2-2-3-1	Unexpected Interrupt Test Error	Unexpected interrupt	Change CPU or system board
2-3-1-3	All Memory Group Errors	Memory address signal failure	Change DIMM or M/B
3-3-1-4	Memory Not Detected	—	—
1-2	Option ROM Initialization Error	Failure to initialize Option ROM BIOS	Change system board or option board
1-2	Video configuration fails	Failure to initialize VGA BIOS	Change option video board or system board
1-2	OPTION ROM Checksum Error	Failure to initialize Option BIOS	Change M/B or option board

How to Identify BIOS and BMC Revision Levels

To help you identify your system's current BIOS and BMC revision levels, refer to the following subsections.

BIOS Revision Level Identification

During system Power-On Self Test (POST), which runs automatically when your system is powered on, your system monitor displays several messages, one of which identifies the BIOS revision level currently loaded on your system, see the example below.

> ***Note:*** In order to see the diagnostic messages, the ESC key must be pressed.

Example: BIOS Revision Level

```
Phoenix BIOS 4.0 Release 6.0.250A
```

In the example above, BIOS 6.0.250A is the current BIOS revision level loaded on your system.

> ***Note:*** The BIOS Revision Level stated in the example may not reflect the actual BIOS setting in your system.

BMC Revision Level Identification

During system Power-On Self Test (POST), which runs automatically when your system is powered on, system diagnostics are run. Following the memory test diagnostic, several messages will appear informing you that the mouse was detected and system configuration data updated, when you see these messages the BMC messages are displayed next.

> ***Note:*** In order to see the diagnostic messages, the ESC key must be pressed.

To identify your system's current BMC revision level, see the example below.

Example: BMC Messages

```
Base Board Management Controller
Copyright (c) 1999 NEC Corporation, all rights reserved.
Device ID          :01        Device Revision      :00
IPMI Version       :1.0       Firmware Revision    :00.60
Self Test Result   :
```

In the example above, Firmware Revision 00.60 is the current BMC revision level loaded on your system.

> ***Note:*** The Firmware Revision Level stated in the example may not reflect the actual BMC revision level setting in your system.

How to Identify System Event Log Data

To help you identify your System Event Log Data, refer to the following Tables.

Table 5-3. System Event Logging Data

Sensor Type	Sensor Type Code	Sensor Specific Offset	Event Type
Reserved	00h	–	Reserved
Temperature	01h	–	Temperature
Voltage	02h	–	Voltage
		01h	Performance Lags
Fan	04h	–	Fan
Physical Security	05h	04h	LAN Leash Lost (System LAN Unplugged)
Platform Security Violation Attempt	06h	00h	Secured Mode Violation Attempt
		03h	Pre-boot Password Violation - Network Boot Password
Processor	07h	00h	IERR
		01h	Thermal Trip
		02h	FRB1/BIST Failure
		04h	FRB3/Processor Startup/Initialization Failure (CPU didn't start)
		08h	Processor Disabled
Power Unit	09h	03h	Interlock Power Down
Memory	0Ch	00h	Correctable ECC
		01h	Noncorrectable ECC
POST Memory Resize	0Eh	–	POST Memory Resize
POST Error	0fh	–	POST Error
Event Logging Disabled	10h	00h	Correctable Memory Error Logging Disabled
		01h	Event "Type" Logging Disabled
		02h	Log Area Reset/Cleared
		03h	All Event Logging Disabled
System Event	12h	00h	System Reconfigured
		01h	OEM System Boot Event (Hard Reset)
Critical Interrupt	13h	00h	NMI (Dump Switch)
		02h	I/O Channel Check NMI
		04h	PCI SERR
		05h	PCI PERR

Table 5-3. System Event Logging Data (Continued)

Sensor Type	Sensor Type Code	Sensor Specific Offset	Event Type
Button	14h	00h	Power Button
		01h	Sleep Button
		02h	Reset Button
Module/Board	15h	–	CPU/Terminator Missing
System Boot Initiated	1Dh	03h	User Requested PXE boot
		04h	Automatic Boot to Diagnostic
Boot Error	1Eh	00h	No Bootable Media
		02h	PXE Server Not Found
OS Boot	1Fh	01h	C: Boot Completed
		02h	PXE Boot Completed
		03h	Diagnostic Boot Completed
		04h	CD-ROM Boot Completed
OS Critical Stop	20h	00h	Stop during OS Load/Initialization
		01h	Run-Time Stop
System ACPI Power State	22h	00h	S0/G0 Working
		01h	S1 "Sleeping with System N/W & Processor Context Maintained"
		04h	S4 "Non-Volatile Sleep/Suspend-To-Disk"
		05h	S5/G2 "Soft-OFF"
		07h	G3/Mechanical Off
		08h	Sleeping Cannot Differentiate between S1-S3
Watchdog 2	23h	01h	Hard Reset
		02h	Power Down
		08h	Timer Interrupt
SMI Timeout	F3h	–	SMI Timeout
EMP	F5h	00h	Communication Error
Sensor Failure	F6h	00h	I2C Bus Device Address Not Acknowledged
		01h	I2C Bus Device Error Detected
		02h	I2C Bus Timeout
OEM Reserved	F7h - FFh	–	–

Table 5-4. Sensor Type Codes

Sensor Number	Sensor Type
01h	Ambient Temp (MB)
02h	CPU#1 Temp
03h	CPU#2 Temp
20h	+3.3V
21h	+5V
22h	+12V
23h	+3.3Vs
24h	VCCP0 (CPU#1 VRM)
25h	VCCP1 (CPU#2 VRM)
29h	+1.5V
2Ah	+2.5V
2Ch	SCSI A +2.85V
2Dh	SCSI B +2.85V
2Eh	SCSI A Vref0
2Fh	SCSI A Vref1
30h	SCSI A Vref2
31h	SCSI B Vref0
32h	SCSI B Vref1
33h	SCSI B Vref2
40h	CPU Rear Fan (Fan #1)
41h	CPU Front Fan (Fan #2)
42h	Chassis (HDD) Fan (Fan #3)

A

System Cabling

- System Cabling
- Before You Begin
- Static Precautions
- Standard Configuration
- RAID Configuration

System Cabling

This appendix contains information and procedures on cabling configurations used in your system.

The cabling configurations include:

- Standard Configuration
- RAID Configuration.

Before You Begin

⚠ WARNING

The DC push-button on/off switch on the front panel does not turn off the system AC power. Also, +5vdc is present on the system board whenever the AC power cords are connected between the system and an AC outlet. Before doing the procedures in this manual, make sure that your system is powered off and unplug the AC power cords from the back of the chassis. Failure to disconnect power before opening your system can result in personal injury and equipment damage.

Static Precautions

An electrostatic discharge (ESD) can damage disk drives, option boards, and other components. You can provide ESD protection by wearing an antistatic wrist strap attached to chassis ground when handling system components.

Electronic devices can be easily damaged by static electricity. To prevent damage, keep them in their protective packaging when they are not installed in your system.

Standard Configuration

Your system is cabled using a single channel on-board IDE Controller and dual channel on-board Adaptec 7899 SCSI Controller.

The on-board IDE controller supports the standard internally mounted CD-ROM as its master device.

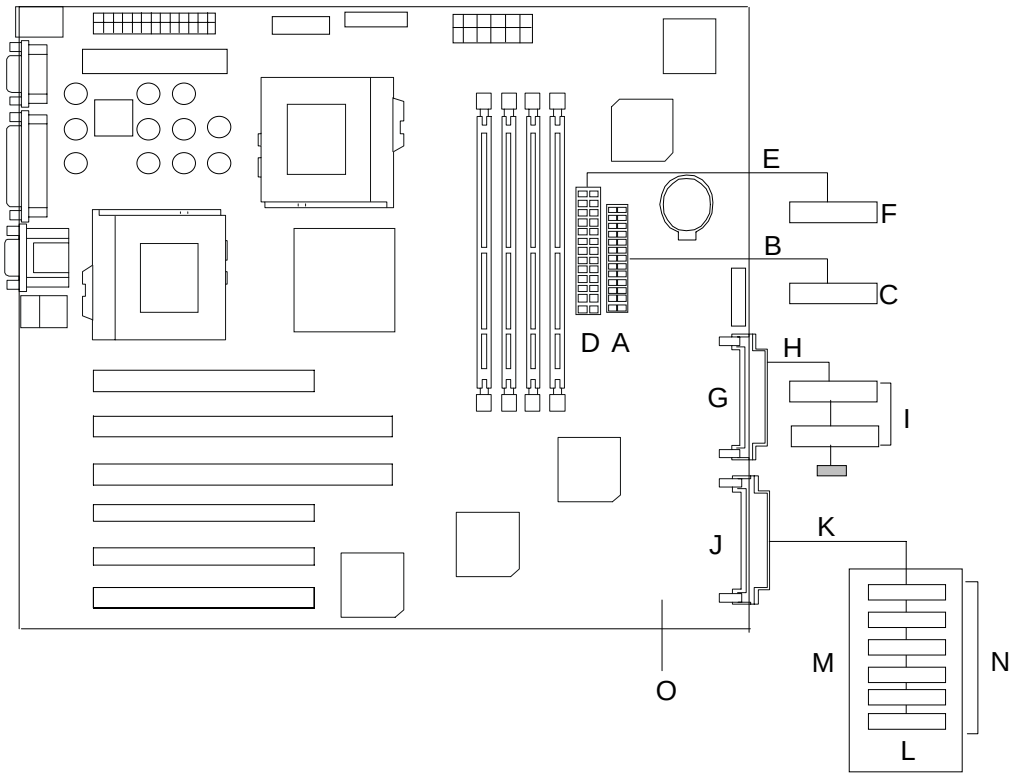
The AIC 7899 contains two independent SCSI channels that share a single PCI bus master interface. Each channel is capable of operations using either 8- or 16-bit SCSI providing 160 MB/s (Ultra-160/M) or 40 MB/s (Wide Ultra) throughput. Channel A attaches directly to a maximum of five 160/M hard disk drives. Controller B can be used to support SCSI devices in the removable media bays.

A 3.5-inch diskette drive is also installed in all systems and interfaces separately to the system board.

Figure A-1 illustrates the standard system configuration. Referring to Figure A-1, a 68-pin Ultra-160/M SCSI interface cable (K) is connected to the SCSI connector (J) on the right edge of the system board. This cable connects to the hard disk drives (N) located in the hard drive bay (L).

The IDE interface cable (E) is connected to the IDE connector (D) towards the middle right edge of the system board. This cable connects to the rear of the internally mounted CD-ROM drive (F).

Optional internally mounted SCSI removable media devices (I) may be connected to the SCSI controller connector (G).



A – Diskette drive connector

B – Diskette interface cable

C – Diskette drive

D – IDE connector

E – IDE interface cable

F – IDE CD-ROM drive

G – Ultra2 SCSI connector (68 pin)

H – Ultra2 SCSI interface cable

I – Optional SCSI removable media devices

J – Ultra-160/M SCSI connector (68 pin)

K – Ultra-160/M SCSI interface cable

L – Six SCSI disk drive bays

M – SCSI backplane

N – SCSI hard disk drives

O – System board

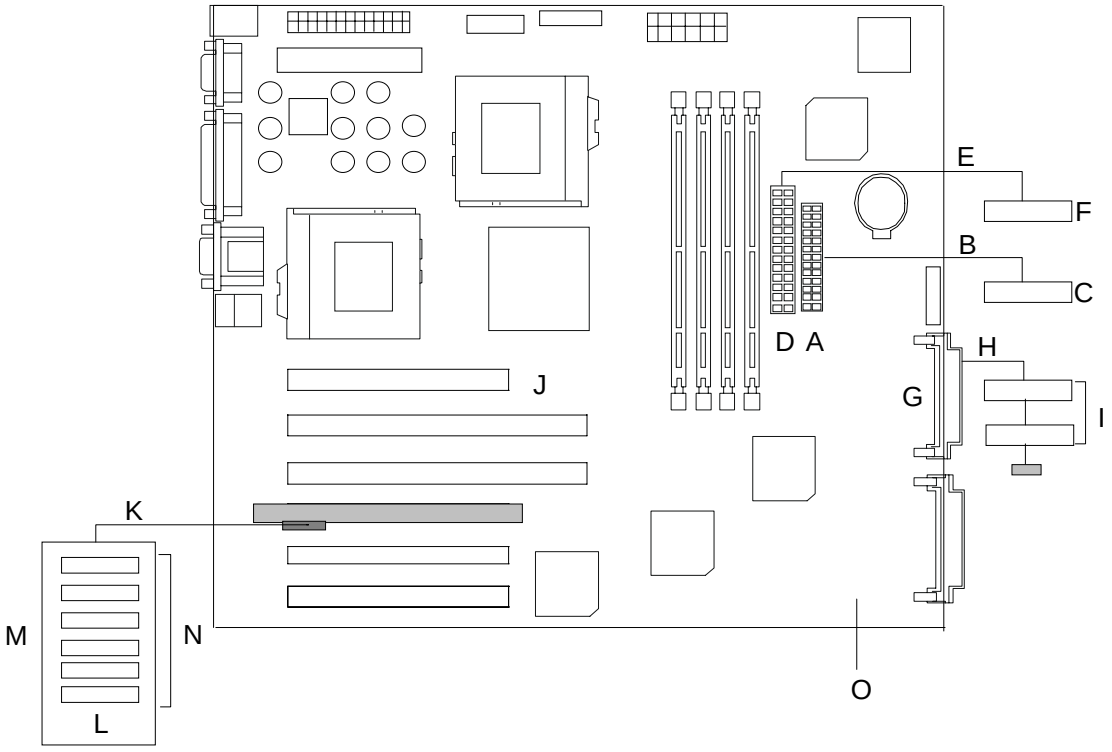
Figure A-1. Standard System Cable Configuration

RAID Configuration

The RAID options available for your system provide your system with the added security of fault tolerance.

If you order a system with a RAID controller, the system is pre-cabled at the factory as shown in Figure A-2.

If you are adding a RAID controller you must install, cable, and configure the controller. Refer to "Installing a RAID Controller Board" in Chapter 4.



A – Diskette drive connector

B – Diskette interface cable

C – Diskette drive

D – IDE connector

E – IDE interface cable

F – IDE CD-ROM drive

G – Ultra2 SCSI connector (68 pin)

H – Ultra2 SCSI interface cable

I – Optional SCSI removable media devices

J – RAID Controller

K – Ultra-160/M SCSI interface cable

L – Six SCSI disk drive bays

M – Drive Bay

N – SCSI hard disk drives

O – System board

Figure A-2. RAID System Cable Configuration

Glossary

A

AC

(Alternating Current) The type of current available in wall outlets. All computers must convert alternating current to direct current to operate. See also DC.

address

A label, name, or number that identifies a location in computer memory.

ASCII

(American Standard Code for Information Interchange) A standard number assigned to each of the alphanumeric characters and keyboard control code keys to enable the transfer of information between different types of computers and peripherals.

B

backplane slot

A connector on the backplane board in desktop computers and expansion boxes that allows you to install circuit cards.

backup

A copy of data for safe-keeping. The data is copied from computer memory or disk to a floppy disk, magnetic tape, or other media.

backup battery

The battery in your computer that maintains the real-time clock and the configuration information when the computer's power is removed.

base memory

An area of memory between 0 and 640 kilobytes.

baud rate

The speed with which data is transmitted during serial communication. The computer's operating system and software program must be configured for the same baud rate as the communication device, such as a serial printer. See also bps.

BIOS

(Basic Input/Output System) A program stored in flash EPROM or ROM that controls the keyboard, disk drives, video monitor, and other devices. See also flash EPROM, EPROM, and ROM.

bit

Derived from BInary digiT, a bit is the smallest unit of information a computer handles. See also byte.

BMC
(Baseboard Management Controller) Contains all of the server management functions. One major function of the BMC is to monitor system management events and log their occurrence in the System Event Log (SEL).

boot
The process of loading the operating system into memory.

bps
(bits per second) The number of bits transferred in one second during serial communication, such as modem transmission.

byte
A group of eight bits.

C

cache memory
A very fast, limited portion of RAM set aside for temporary storage of data for direct access by the microprocessor.

CD-ROM drive
(Compact Disk ROM drive) A type of mass storage device that reads information from a compact disk.

Centronics port
An industry standard parallel port. See also parallel port.

CGA
(Color Graphics Adapter) A type of video display system that provides low-resolution text and graphics on TTL monochrome and color monitors.

CMOS
(Complimentary Metal-Oxide Semiconductor) A type of low-power integrated circuit used in computers. See also TTL.

COM1 or COM2
The name you can assign a serial port to set or change its address. See also serial port.

command
An instruction that directs the computer to perform a particular operation.

configuration
The way in which a computer is set up to operate. Some configurable options include CPU speed, serial port designation, and memory allocation.

CPU
(Central Processing Unit) See microprocessor.

CRT
(Cathode-Ray Tube) The type of video display used in monitors for desktop computers.

D

DC
(Direct Current) The type of current available in the rechargeable battery packs used in portable computers. See also AC.

default
The factory setting your computer uses unless you instruct it otherwise. For example, when powering up, the computer will boot from the default drive.

density
The capacity of information (bytes) that can be packed onto a storage device, such as a floppy disk.

device driver
A software program that a computer must use to recognize and operate certain hardware, such as a mouse or a video monitor.

disk drive
A device that stores data on a hard or floppy disk. A floppy disk drive requires a floppy disk to be inserted; a hard disk drive has a permanently encased hard disk.

DOS
(Disk Operating System) See operating system.

DRAM
(Dynamic RAM) See RAM.

E

ECC
(Error Checking and Correction) A method of detecting and correcting errors.

EEPROM
(Electrically Erasable Programmable Read-Only Memory) A type of memory device that stores password and configuration information.

EGA
(Enhanced Graphics Adapter) A type of video display system that provides medium-resolution text and graphics on TTL monochrome, color, and enhanced color monitors.

EMP
The Emergency Management Port (EMP) provides an interface to the console manager. This interface allows remote server management via a modem or direct connection.

EMS
(Expanded Memory Specification) A method of accessing memory beyond the 640K limit of DOS by exchanging data in and out of main memory at high speeds. Some software requires EMS to operate.

EPROM
(Erasable Programmable Read-Only Memory) A type of memory device that is usually used to store system BIOS code. This code can be erased with ultraviolet light, but is not lost when the computer is powered off. See also flash EPROM and ROM.

expansion slot
See backplane slot.

extended memory
The protected memory above 1M that is directly accessible by the microprocessor through certain utilities and operating systems.

F

flash EPROM
A type of memory device that is usually used to store system BIOS code. This code can be replaced with updated code from a floppy disk, but is not lost when the computer is powered off. See also EPROM and ROM.

floppy disk drive
See disk drive.

format
The process used to organize a hard or floppy disk into sectors so it can accept data. Formatting destroys all previous data on the disk.

FRB (Fault Resilient Boot
A server management feature. FRB attempts to boot the system using the alternate processor or DIMM.

G

(Gigabyte)
1,073,741,824 bytes. See also byte.

H

hard disk drive
See disk drive.

hardware
The physical parts of your computer, including the keyboard, monitor, disk drives, cables, and circuit cards.

hot swap
A method used to insert or remove SCSI disk drives into or from an operating bus. This method is typically used in RAID subsystems. When used in non-RAID subsystems the operating system must typically be restarted.

I

IC
(Integrated Circuit) An electronic device that contains miniaturized circuitry.

IDE
(Integrated Drive Electronics) A type of hard disk drive with the control circuitry located inside the disk drive rather than on a drive controller card.

interface.
A connection between the computer and a peripheral device that enables them to exchange data. See also parallel port and serial port.

ISA
(Industry Standard Architecture) An industry standard for computers and circuit cards that transfer 16 bits of data at a time.

J

jumper
A small electrical connector used for configuration on some computer hardware.

K

(Kilobyte)
1,024 bytes. See also byte.

L

LAN
(Local Area Network) A group of computers linked together within a limited area to exchange information.

LCD
(Liquid Crystal Display) The type of video display used in portable computers.

LED
(Light-Emitting Diode) A small electronic device that glows when current flows through it.

LPT1 or LPT2
The name you can assign a parallel port to specify its address. See also parallel port.

LVD
Super-fast Ultra 2 SCSI Low Voltage Differential (LVD) Parallel SCSI Interface. A new SCSI interface that provides greater I/O bandwidth, device connectivity, data reliability, and longer cable lengths for Ultra2 SCSI hard disk drives. Note that in order to achieve LVD performance all devices including cable, controller, and drive must support LVD.

M

(Megabyte)
1,048,576 bytes. See also byte.

memory
The circuitry in your computer that stores data and programs. See also EMS, extended memory, RAM, and ROM.

microprocessor
The integrated circuit that processes data and controls the basic functions of the computer.

modem
A device used to exchange information with other computers over telephone or data lines.

module
A circuit board that plugs into a dedicated connector on the system board in your computer.

mouse
A small input device that you guide on a flat surface to control the cursor movement and operation of the computer when using certain software programs.

N

NVRAM
(Nonvolatile RAM) A type of RAM that retains its contents even after the computer is powered off. This memory stores EISA configuration information. See also RAM and SRAM.

O

operating system
A set of programs that provides the interface between other software programs and the computer.

P

parallel port
The connector on the back of your computer that allows the transfer of data between the computer and a parallel device, such as a parallel printer.

partition
The process of dividing the storage space on a hard disk into separate areas so that the operating system treats them as separate disk drives.

password
A security feature that prevents an unauthorized user from operating your computer. See also EEPROM.

PCI
Peripheral Component Interconnect. PCI is a high-performance peripherals I/O bus supporting data transfers of up to 528MB per second.

Pentium
A type of microprocessor, with a built-in math coprocessor, cache memory, and memory and bus controllers, that processes and communicates 32 bits of data at a time. This microprocessor also contains power management capabilities.

peripheral
A device connected to and controlled by the computer, such as an external disk drive or a printer.

pixel
The smallest element that is visible on a video display. The resolution of a video display system is measured in pixels.

PnP
(Plug-n-Play) Plug-and-play is the ability to plug a device into a computer and have the computer recognize that the device is there. The user doesn't have to tell the computer.

POST
Power-On-Self-Test.

R

RAM
(Random-Access Memory) A temporary storage area for data and programs. This type of memory must be periodically refreshed to maintain valid data, and is lost when the computer is powered off. See also NVRAM and SRAM.

real-time clock
The IC in your computer that maintains the time and date.

ROM

(Read-Only Memory) A type of memory device that usually is used to store system BIOS code. This code cannot be altered and is not lost when the computer is powered off. See also BIOS, EPROM, and flash EPROM.

RS-232C port

An industry standard serial port. See also serial port.

S

SAF-TE

(SCSI Accessed Fault Tolerant Enclosure) A specification for monitoring the state of the drives and enclosure environment (fan, power supply, temperature, etc.) using the SCSI bus to indicate faults.

save

To store information on a floppy disk, hard disk, magnetic tape, or some other permanent storage device.

SCSI

(Small Computer System Interface) An industry standard interface that provides high-speed access to tape drives, hard disk drives, and other peripheral devices.

SEL

(System Event Log) A record of system management events. The information stored includes the name of the event, the date and time the event occurred and data pertinent to the event. Event data may include POST error codes that reflect hardware errors or software conflicts within the system.

serial communication

Information sent sequentially, one bit at a time.

serial port

The connector on the back of your computer that allows the transfer of data between the computer and a serial device, such as a mouse, a modem, or a serial printer.

setup program

The program that you use to change the configuration of some ISA desktop and notebook computers. This program also contains information about the hardware in the computer.

software

Programs with specific functions, such as word processing, data base management, communications, and operating system.

SRAM

(Static RAM) A temporary storage area for data and programs. This type of memory does not need to be refreshed, but it is lost when the computer is powered off. See also NVRAM and RAM.

SVGA

(Super VGA) A type of video display system that provides very high-resolution text and graphics on analog color monitors.

system board

The main circuit board in your computer. It contains most of the connectors and ports.

T

tape drive

A type of storage device using magnetic tape.

TTL

(Transistor-Transistor Logic) A type of integrated circuit used in computers. See also CMOS.

U

ultra 160/m SCSI

Ultra 160/m is a parallel SCSI interface based on Ultra3 SCSI technology. This interface features data transfer speeds up to 160MB/second (double-edge clocking), cyclical redundancy checking (CRC) providing higher levels of data reliability, and domain validation that detects the configuration of the SCSI bus and automatically tests and adjusts the SCSI bus transfer rate to optimize interoperability. Note that the Ultra 160/m uses the standard Ultra2 LVD cabling and termination, making it backward compatible for easy implementation.

V

VGA

(Video Graphics Array) A type of video display system that provides high-resolution text and graphics on analog color monitors.

Equipment Log

Use this equipment log form to record pertinent information about your system. You will need some of this information to run the System Setup Utility. Be sure to update the equipment log when you add options.

Record the model and serial numbers of the system components, dates of component removal or replacement, and the name of the vendor from whom the component was purchased. Be sure to record the same information for any components added to the system, such as a power supply, hard disk drives, add-in boards, or printers.

Record the model and serial numbers of the unit and system baseboard. The model and serial numbers of the system unit are recorded on a label attached to the rear of the unit. The serial number of the system board is located along the left side of the board, near the PCI expansion slot covers.

The location of serial numbers on add-in boards, hard disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another. Literature accompanying these products should illustrate or describe the location of model and serial numbers.

Component	Manufacturer Name & Model	Serial Number (if available)	Date Installed
Server			
System Board			
Processor 1			
Processor 2			
DIMM Slot 1			
DIMM Slot 2			
DIMM Slot 3			
DIMM Slot 4			
Modem			
Diskette Drive A			
Tape Drive 1			
Tape Drive 2			
CD-ROM Drive 1			
Hard Disk Drive 1			
Hard Disk Drive 2			
Hard Disk Drive 3			
Hard Disk Drive 4			
Hard Disk Drive 5			
Hard Disk Drive 6			
Optional RAID Controller			
Network Controller 1			
Network Controller 2			
Monitor			
Keyboard			
Mouse			
External Peripheral 1			
External Peripheral 2			
Power Supply			

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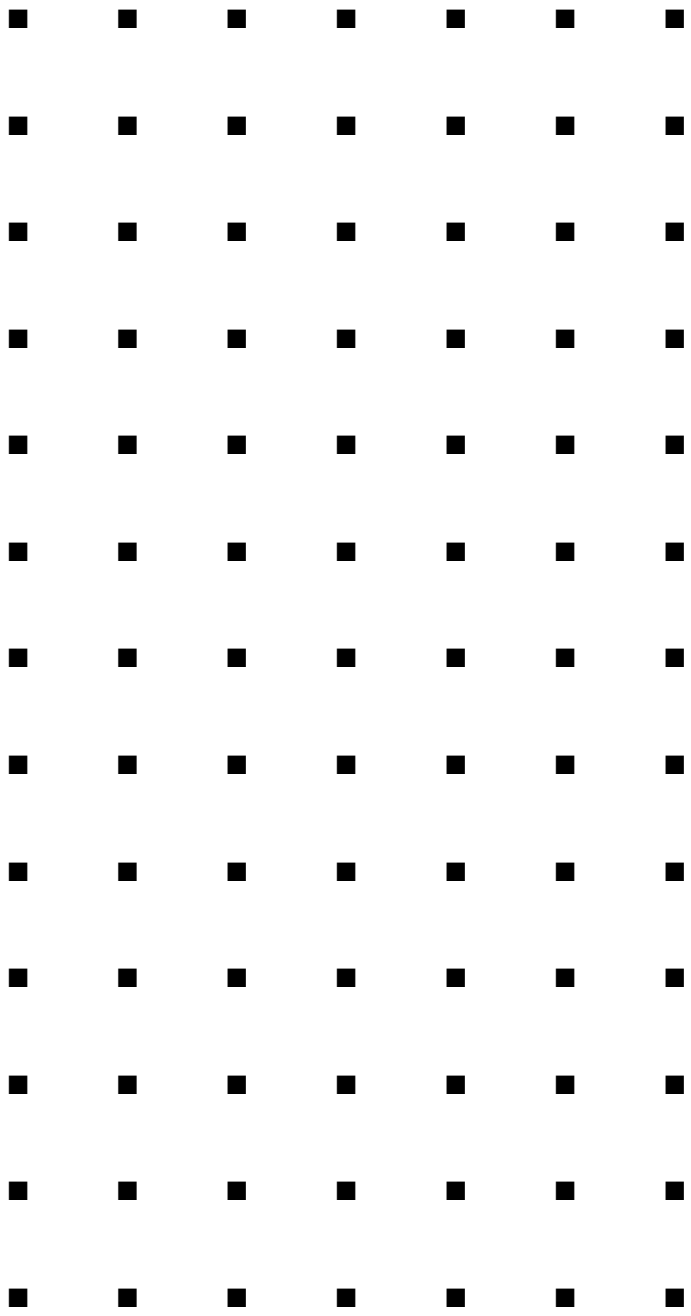

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